

John T. Allen

NEW YORK
ZOOLOGICAL SOCIETY

1895



1951

FIFTY-SIXTH

ANNUAL REPORT

FOR THE YEAR 1951

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30 East 40th Street, New York 16, N. Y.

THE ZOOLOGICAL PARK
Bronx Park, New York 60, N. Y.



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MEMBERSHIP IN THE
NEW YORK ZOOLOGICAL SOCIETY

THE NEW YORK ZOOLOGICAL SOCIETY was founded in 1895 for the "instruction and recreation of the people" through the establishment of a Zoological Park, for the promotion of zoology through exhibition of collections, publication, research and exploration, and for the conservation of animal life of the world. Since 1899 the Zoological Society has directed the New York Zoological Park and in 1902 it was entrusted with the management of the New York Aquarium.

Membership is actively invited of all persons who are interested in the objects of the Society and desire to contribute toward its support.

Annual Membership is \$15. Contributing Membership is \$25. These Memberships entitle the holders to Member's cards and 10 guest tickets of admission to the Zoological Park on pay days; a copy of the Annual Report; a subscription to Animal Kingdom, the bi-monthly publication of the Society; privileges of the Library and Members' Lounge in the Administration Building and to attend all open meetings of the Society. Tickets to all sections of the Zoological Park for which an admission charge is made are available, free, to Members upon application at the Administration Building in person. Members will be taken on "behind the scenes" tours of the Zoological Park and Aquarium, without charge, on application, and are entitled to 20% discount on all publications of the Society. We are advised that Contributing Membership fees are deductible from income tax within the legal limits.

Life Membership is \$300. See By-laws for conversion of Annual and Contributing to Life Membership. Other classes of membership are: Patron, \$1,000; Associate Founder, \$2,500; Founder, \$5,000; Founder in Perpetuity, \$10,000; Benefactor, \$25,000.

Applications for membership may be submitted to any officer of the Society or to the Society's general office at 30 East 40th Street, New York 16, N. Y.

FORM OF BEQUEST

I do hereby give and bequeath to the "New York Zoological Society," of the City of New York.....
.....
.....

REPORT OF THE PRESIDENT

YEAR BY YEAR, as our institution progresses, some new opportunity seems to make its appearance, often quite unexpectedly.

This year the "new idea" is a program of aid to European biologists. A year ago we were totally unaware of the fact that highly advanced technical work, some of it breaking entirely new ground in biology, was being hampered by shortages of equipment, technical literature and research specimens that are taken for granted in American laboratories. Then, last summer, Miss Jocelyn Crane, of our Department of Tropical Research, attended a scientific conference in Europe and in the course of post-conference visits to various laboratories quite accidentally discovered surprising needs and shortages. Her report indicated that effective help might be extended through the use of relatively limited funds. One of the Charter purposes of our institution is the promotion and advancement of zoological knowledge. Obviously such knowledge has no national boundaries and consequently our institution is embarking on its own Point Four program of aid to European scientists, which a recent editorial in the New York Herald Tribune described as "internationalism in the best sense."

Our scientific activities are advancing well. Dr. William Beebe's selection of "Simla" on the island of Trinidad as the site of the Department of Tropical Research station has been fully justified, and it is doubtful whether any location in the tropics could be more ideal for combined field observations and laboratory studies. The research station at Jackson Hole, Wyoming, oriented its work more directly towards ecology and wild animal behavior studies in accordance with the policies established at the end of last year with the help of the Advisory Committee, consisting of Dr. C.R. Carpenter of Pennsylvania State College, Dr. Robert K. Enders of Swarthmore College and Dr. Warren W. Chase of the University of Michigan. The progress of research

work being carried out by the staff members in the various laboratories is reported in detail in the ensuing departmental sections.

The work of the administrative staff as well as that of all employees cannot be too highly commended. The Zoological Park Council, consisting of elected representatives of all operating departments, has aided immeasurably in the efficient operation of the Park and the quality and kind of service that our institution is determined to extend to the public.

The finances of the Society continue in satisfactory shape, with another year closed wherein income from endowment and membership dues was in excess of operating expenses. Capital funds were augmented by \$61,317.16 and current research projects by \$30,386.45 received from contributions, legacies and grants. Income from membership dues reached a figure in excess of \$42,000, the largest in the Society's history. One of the gratifying developments is the growth of the new class of membership known as Contributing Members, with dues of \$25 a year. At the year's end the number of members in this class totalled 574.

Messrs. John Elliott, Robert G. Goelet and Edwin S. Webster were welcomed to membership on the Board of Trustees.

All in all, there is full justification for the belief that our institution is steadily going forward in its services to the public, to scientific research, to education and to conservation.

Within and around all other activities and objectives during the past year, or any other year, there remains the central purpose to which our institution is dedicated--namely, that of creating a better understanding on the part of human beings of the value and inspiration to be gained from a knowledge of the animal world. It is a goal towards which all our energies can be bent indefinitely.

THE ZOOLOGICAL PARK

John Tee-Van, Executive Secretary

A ZOOLOGICAL PARK without animals or without visitors to appreciate the animals would be an absurdity and an impossibility--animals and humans are of equal value and importance in a zoo. So, in the constant changes that are being made for the betterment of the Zoological Park, a balance has been maintained between the development of new and better ways to show and care for our animals, and in furnishing better services for the public. In 1951, the balance was well kept. For the public, restaurant facilities were greatly enhanced when a large, colorful and pleasing modern cafeteria, situated in the center of the Park and replacing the archaic Picnic Pavilion, was opened for use on November 18. For the animals, a number of betterments were completed--the most important being the rehabilitation of the elephant yards on the southeast corner of the Elephant House. Unsightly, heavy steel fences, strongly reinforced by railroad rails, have been replaced by simple, well-designed stone walls with depressed moats on the Elephants' side so that both public and Elephants can now freely and safely enjoy each other. The barriers--physical and psychological--have been minimized. In addition, the outside moated areas of the Great Apes House have been reconstructed and these pleasing enclosures are ready for the spring occupancy of our wonderful collection of Gorillas, Chimpanzees and Orang-utans. Another large and important improvement is the reconditioning of the drainage and repaving of the outside yards of the Zebra House.

Affecting both animals and visitors to the Park is a comprehensive and coordinated color scheme for painting Park buildings and installations which has been prepared by color consultant Teresa Kilham. A number of elements of the plan have been completed, the most important being the Eagle Aviary and the entrances of the important buildings on Baird Court. The plan will be well under way by the spring opening of 1952.

The relationship of good weather, especially on week-ends and holidays, to large attendance at the Park was well demonstrated in 1951 when 2,583,471 visitors entered the gates--105,532, or 4.26%, more than the preceding year and 90,613, or 3.63%, more than the average of the past ten years. This number of visitors naturally increased the use of all our facilities and details of the extended usage will be found in other parts of this report.

An illuminating light is cast on the tastes and appetite of the American public that came to the Zoo, in that during 1951 we served and sold the following:

- 606,456 frankfurters (50,538 pounds)
- 4,944 pounds of coffee
- 629,400 bottles of soda (26,225 cases)
- 197,200 containers of orange drink at
Lake Terrace Kiosk alone
- 5,338 gallons of ice-cream
- 428,604 ice-cream pops
- 2,778 pounds of assorted cheese
- 28,458 balloons
- 26,881 Bronx Zoo banners

The welfare of the Society's employees is constantly in the minds of the Society's officers and staff, and in the fostering of good employee relations immediate recognition must be given to the splendid work accomplished by the Zoological Park Council. The council, composed of elected representatives of various departments of the Park and certain staff officers, meets bi-weekly (or more often, if necessary) to discuss the operation of the Park, usually with especial reference to the human aspects of its operation.

Among the important matters that the Council has worked upon is the entrance of Zoological Society employees into Social Security coverage as of January 1, 1951, upon which date employees of non-profit organizations were allowed to come under Federal Old Age Insurance or Social Security. The conditions for entry into Social Security required that the Society signify that it was willing to assume its financial share of the cost and that two-thirds of the employees indicate by vote that they wished to become members of this Federal plan.

In December, 1951, as the result of Council discussions, the Executive Committee voted to provide funds for the Society's contribution toward a Group Life Insurance Policy covering Society employees; two hundred employees assumed their share of the

costs of this important and fundamental improvement in security, thus enabling Group Life Insurance to go into effect on January 1, 1952.

Of equal importance was the inclusion of the Society's employees, together with those of other City-assisted cultural institutions, in the classification and wage studies now being made of some 86,000 City employees by Griffenhagen & Associates for the Mayor's Committee on Management Survey. The participation of the cultural institutions in this study, which was instigated and fostered by the Society's officers and which has been greatly aided by the expressions of the Honorable Robert Moses, Commissioner of Parks, is an important step in the program for securing greater financial assistance so that our employees will be compensated at rates comparable to those of City employees of equal positions.

The Safety Committee--offshoot of the Zoological Park Council--although it did not win any awards during the past year, has functioned effectively to reduce accidents to employees and visitors, and has now become integrated with a city-wide municipal plan to reduce accidents.

Three staff officers of the Society have now completed service records of forty years or more--Dr. William Beebe, 53 years; Lee S. Crandall, 44 years; and John Tee-Van, 40 years. The position of Curator of Reptiles, vacated by the untimely death of Brayton Eddy, was filled by Dr. James A. Oliver, former Associate Curator of Herpetology at the American Museum of Natural History and Associate Professor of Zoology at the University of Florida. Dr. Oliver's eminence in the scientific world and his possession of an excellent sense of public relations, are good indications that the Society's traditions and public service desires will be well fulfilled.

Cooperation with the Educational Department of the City continues and the fourth and fifth sessions of a fifteen-weeks course were given during the year to public school teachers on the subject of "How to Use the Facilities of the Zoo." The course continues to be oversubscribed and is evidently exceedingly popular with public school and high school teachers.

Continuing work that has been under way during previous summers, two Animal Behavior Fellowships were completed--one by Mr. Joseph A. Murnin of Pennsylvania State College, who continued his work

on Elephants and other mammals, and a second by Mr. John V. Quaranta who made studies using complicated electrical and optical apparatus on the visual sense of the Giant Galapagos Tortoise.

In keeping with the Society's policy that staff officers should have opportunities to take part in meetings and conferences, not only to keep abreast of new developments in science and animal care, but also because of the contributions they may be able to make out of their own experiences and work, a number of staff officers attended meetings at home and abroad. Briefly listed, they are as follows:

Lee S. Crandall, General Curator, attended the annual meeting of the International Union of Directors of Zoological Gardens held in Amsterdam and visited zoological gardens at Rotterdam, Antwerp and Paris.

Myron Gordon, Geneticist, attended the annual meeting of the American Association for the Advancement of Science held in Philadelphia, and the Tenth Annual Growth Conference at Smith College.

Ross Nigrelli, Pathologist, attended the New York Academy of Sciences Conference on "Viruses as Causative Agents in Cancer," and the annual meeting of the American Association for the Advancement of Science in Philadelphia.

Christopher Coates, Curator and Aquarist, attended the Eighty-first Annual Meeting of the American Fisheries Society, the Fourteenth Annual Meeting of the American Society of Limnology and Oceanography and the Forty-first Annual Convention of the International Association of Game, Fish and Conservation Commissioners which were held in Rochester. Mr. Coates also attended the annual conference of the American Association of Zoological Parks and Aquariums held in Miami, Florida.

Leonard Goss, Veterinarian, attended the annual meeting of the New York State Veterinary Medical Society in Elmira and the annual meeting of the American Veterinary Medical Association in Milwaukee. Dr. Goss also attended the annual conference of the American Association of Zoological Parks and Aquariums held in Miami, Florida.

John Tee-Van, Executive Secretary, attended a conference at the Roscoe B. Jackson Laboratories at Bar Harbor in September on the subject of "The Effects of Early Experience." With Mr. James W. Atz, Assistant Curator of the Aquarium, Mr. Tee-Van also attended meetings of the American Society of Ichthyologists and Herpetologists at Chicago and visi-

ted the Brookfield and Detroit Zoos.

Plans that were being developed in 1951 for the future of the Zoological Park include the reorganization of the Crotona and Buffalo Parking Fields, and a new entrance at Boston Road and 182nd Street, necessitated by the closing of the Boston Post Road to motor traffic and the inclusion of three-quarters of a mile of this ancient highway into the Zoological Park. Plans and specifications for a new parking field in the northeast corner of the Park adjacent to the newly completed Bronx River Parkway were completed and at the year's end were before the Board of Estimate for action. To the cost of this new and important facility the Society contributed 50%, which will be matched by the City. The field will not only serve its immediate surroundings--the Farm-in-the-Zoo, the Conservation Exhibit and the Casting Pool--but will be highly instrumental in taking care of the Zoo's parking problem as a whole. It will be even more important when street and parkway developments near the northern end of the Zoological Park, known as the Fordham Improvement, are completed.

THE ANIMAL DEPARTMENTS

MAMMALS AND BIRDS

Lee S. Crandall, General Curator
Robert M. McClung, Assistant Curator, Mammals and Birds
Grace Davall, Assistant to the General Curator
August Schilling, Head Keeper of Mammals
George Scott, Head Keeper of Birds

AS POINTED OUT in last year's report and in those of several recent years, rising costs in most parts of the world have brought increasing difficulties to the task of maintaining collections of living creatures. Very little useful material is available from usual sources and only extraordinary effort and planning, through varied channels, will produce the replacements we require.

We still rely to a large extent on the resourcefulness and skill of Charles Cordier, now working independently in Ecuador. In October of 1951, Cordier sent a fairly large collection of birds to his local outlet, from which we were able to make much-needed selections. It is hoped that in the spring of 1952 a really large consignment will follow.

From June 2 to June 6, the General Curator attended the annual meeting of the International Union of Directors of Zoological Gardens, held in Amsterdam. Representatives of seventeen zoological gardens in thirteen countries, including Japan, were present. Moving pictures of our more recent new installations and additions to the collection were fully appreciated. During and following the meeting, the zoological gardens of Amsterdam, Rotterdam, Antwerp and Paris, as well as several commercial establishments, were visited. In the course of the trip, which ended on June 13, several projects in the interests of the American Committee for International Wild Life Protection were carried out.

MAMMALS - Having determined that the summer season should be devoted to giving our Platypuses, Cecil and Penelope, an opportunity to breed, the animals were placed in the outdoor Platypusary on May 13.

Although Penelope burrowed assiduously in her earth mound, from which Cecil was excluded by a narrow entrance, it was obvious by October that there would be no result and the Platypuses were taken indoors on the 9th. In 1952, we shall risk putting the animals outdoors in April and if breeding does not occur by mid-summer, the exhibit probably will be opened again to the public.

On April 13, the six young male Lions, which had been in preparation for eighteen months, were liberated on Lion Rock at the African Plains. Well grown and handsome at the age of two years, the animals make a superb group, a striking replacement of the three animals shown there since 1941 and rapidly becoming aged.

Arrivals in general were somewhat less than normal. They totalled 51, of which 16 came as gifts and 35 by purchase.

A lovely albino White-tailed Deer fawn, believed to have been born on Robins Island in Peconic Bay, Long Island, was received through the kindness of Messrs. J. Watson Webb and Samuel Webb. A fine young male Sitatunga, an antelope not then represented in our collection, was presented by the Chicago Zoological Park on May 4. Three Arabian Gazelles were flown from Beirut as the gift of Dr. Frank J. Zukoski, to replace a previous group that had succumbed to acute calcium deficiency.

On May 22, an infant male Lowland Gorilla, named Mambo, was secured. Mambo weighed only sixteen pounds on arrival but had more than doubled his weight by the end of the year.

A young female specimen of the rare Schweinfurth's Chimpanzee, a native of the Belgian Congo, was purchased on January 29. In the middle of October we received from Denmark a sturdy male Atlantic Walrus. This cumbersome animal, born somewhere to the north in the spring of 1951, weighed 240 pounds on arrival. We are following a feeding schedule developed in the Zoological Gardens of Copenhagen and the animal is responding well.

Through one of the vagaries of the wavering market, we were able to secure, late in the summer, a number of marmosets not previously shown here. Our collection of these attractive little Primates reached an unprecedented total of fourteen species.

Births in the collection during the year numbered 94, of which 79 were living on December 31. These represented 31 forms, as follows: 1 Red Kangaroo, 1 Slow Loris, 1 Common Marmoset, 1 Diana

Monkey, 1 White-handed Gibbon, 3 Patagonian Cavies, 4 Bengal Tigers, 1 California Sea Lion, 2 Chestnut Duikers, 1 Blue Duiker, 2 Nyalas, 1 White-eared Kob, 1 Addax, 3 Blackbuck, 4 Elk, 2 Pere David's Deer, 2 Axis Deer, 4 Sika Deer, 10 White-tailed Deer, 4 European Red Deer, 4 Barasingha Deer, 3 Formosan Deer, 3 Indian Sambar Deer, 3 Reeves's Muntjacs,

CENSUS OF MAMMALS
December 31, 1951

<u>Orders</u>	<u>Species</u>	<u>Specimens</u>
MONOTREMATA		
Platypus and Echidnas	2	3
MARSUPIALIA		
Kangaroos, Opossums, etc.	12	20
INSECTIVORA		
Moles, Shrews, Hedge- hogs, etc.	2	2
PRIMATES		
Apes, Baboons, Mon- keys, Lemurs, etc.	50	89
EDENTATA		
Armadillos, Sloths and Anteaters	2	2
RODENTIA		
Squirrels, Marmots, Beavers, etc.	17	32
CARNIVORA		
Cats, Dogs, Bears, etc.	27	75
PINNIPEDIA		
Sea Lions, Walruses, Seals	4	11
PROBOSCIDEA		
Elephants	3	5
HYRACOIDEA		
Hyraxes	1	1
PERISSODACTYLA		
Rhinoceroses, Horses Tapirs	7	11
ARTIODACTYLA		
Hippopotamuses, Camels, Deer, Cattle, etc.	<u>59</u>	<u>284</u>
<u>Totals</u>	186	535

Summary: Orders, 12; Species, 186; Specimens, 535

3 Chinese Water Deer, 6 Aoudads, 2 Mouflon, 2 Himalayan Tahr, 1 Gayal, 2 Guanacos and 1 Llama.

Losses by death deprived us of several outstanding specimens, most of which had high-lighted our collections for long spans of years. The tragic drowning of Makoko on May 13, the deaths of our female Giant Panda on October 31 and of our old female Bongo, Doreen, on March 23, represent almost irreparable losses. Young Mambo may one day reach a stature comparable to that of Makoko and good fortune may eventually bring us another Bongo. But a Giant Panda is unlikely to come our way until conditions in the East have improved to a far greater extent than is indicated for the immediate future.

During the year, 46 surplus mammals were sold for a total of \$4,105.

BIRDS - While no new installations were provided for this Department during 1951, various improvements of those already in use enabled us to maintain a high operational level. The kitchen of the Large Bird House was completely modernized, the Pheasant Aviary was repainted, the Flamingo Pool was excavated and a change in water management at the Penguin House brought a much better result.

Arrivals reached the comparatively small total of 191, an indication of our constantly reducing sources of supply. Of these newcomers, 127 were obtained by purchase, 58 by gift and one by exchange, while three young birds were bred in the collection and two were collected by the Bird House staff. Of these arrivals, the following sixteen forms proved to be new to the collection:

Ringed Penguin - Pygoscelis antarctica (Forster)

Red-cheeked Ibis - Comatibis eremita (Linnaeus)

Philippine Duck - Anas luzonica Fraser

Hartlaub's Touraco - Tauraco hartlaubi (Fisher & Reichenos)

Eastern Equatorial Barbet - Eubucco bourcierii orientalis Chapman

Red-crowned Green Woodpecker - Piculus rubiginosus rubripileus (Salvadori & Festa)

Coronated Manakin - Masius chrysopterus coronulatus Sclater

Japanese Robin - Erithacus akahige (Temminck)

Ecuadorian Banana-quit - Coereba flaveola intermedia (Salvadori & Festa)

Pale-bellied Euphonia - Tanagra lanirostris hypoxantha (Berlepsch & Taczanowski)

Bourcier's Green Calliste - Chlorochrysa calli-
paraea bourcierii (Bonaparte)
 Schrank's Calliste - Tangara schrankii (Spix)
 Goodson's Golden Calliste - Tangara arthus goodsoni
 Hartert
 Golden-eared Calliste - Tangara chrysotis (Du Bus)
 White-shouldered Black Tanager - Tachyphonus luctu-
osus luctuosus Lafresnaye & d'Orbigny
 Pacific Orange-billed Sparrow - Arremon aurantii-
rostris occidentalis Hellmayr

Most important of the gifts were two Darwin's Rheas, presented by one of our Trustees, Mr. Robert G. Goelet. These were the first specimens of this attractive species to be imported since pre-war days. Among the purchases were 35 birds of 24 forms, selected from a trial shipment sent by Charles Cordier. A young Shoe-bill was purchased in July and four Ringed Penguins were obtained from the Zoological Gardens of Edinburgh in October. A fully adult pair of Great Argus Pheasants, purchased from the Zoological Gardens of Rotterdam, represent the first importation of this superb species in many years.

A rather curious happening increased our total by two. Two handsome Red-billed Blue Magpies, in process of being lent to the New York Botanical Gardens for greenhouse display there, escaped within the grounds of our sister institution. Later, the pair nested on the bank of the Bronx River. Subsequently two young birds were removed by our staff as a precaution against marauding boys and successfully handreared, and in the fall the parents themselves were recaptured through the persistent efforts of Head Keeper George Scott.

CENSUS OF BIRDS December 31, 1951

<u>Orders</u>	<u>Species</u>	<u>Specimens</u>
STRUTHIONIFORMES		
Ostriches	1	1
RHEIFORMES		
Rheas	2	3
CASUARIIFORMES		
Cassowaries and Emus	2	3
TINAMIFORMES		
Tinamous	1	1
SPHENISCIFORMES		
Penguins	6	21

<u>Orders</u>	<u>Species</u>	<u>Specimens</u>
PELECANIFORMES		
Pelicans, Cormorants, etc.	7	19
CICONIIFORMES		
Herons, Ibises, Storks, Flamingos, etc.	25	52
ANSERIFORMES		
Swans, Ducks, Geese and Screamers	59	404
FALCONIFORMES		
Vultures, Hawks and Eagles	22	25
GALLIFORMES		
Quail, Pheasants, etc.	45	111
GRUIFORMES		
Hemipodes, Cranes, Trumpet- ers, Rails, etc.	25	56
CHARADRIIFORMES		
Plovers, Sandpipers, Gulls, etc.	18	45
COLUMBIFORMES		
Pigeons, Doves and Sand- grouse	38	82
PSITTACIFORMES		
Parrots, etc.	22	33
CUCULIFORMES		
Touracos and Cuckoos	5	7
STRIGIFORMES		
Owls	9	11
APODIFORMES		
Hummingbirds	4	10
COLIIFORMES		
Colies	1	3
TROGONIFORMES		
Trogons and Quetzals	1	4
CORACIIFORMES		
Kingfishers, Hornbills, etc. ..	12	14
PICIFORMES		
Barbets, Toucans and Woodpeckers	23	29
PASSERIFORMES		
Perching Birds	<u>225</u>	<u>453</u>
<u>Totals</u>	553	1,387

Summary: Orders, 22; Species, 553; Specimens, 1,387

1965
1951

REPTILES AND INSECTS

John Tee-Van, in charge (Jan. 1 to Aug. 31, 1951)
James A. Oliver, Curator (Since September 1, 1951)
Fred Taggart, Head Keeper

THE YEAR BEGAN with Executive Secretary John Tee-Van still in charge of the Department of Reptiles, a responsibility that he has carried intermittently for more than four years. On September 1 Dr. James A. Oliver was appointed Curator of Reptiles. Dr. Oliver is the third Curator of Reptiles in the history of the New York Zoological Society, succeeding the late Dr. Raymond L. Ditmars and the late Mr. Brayton Eddy.

The activities of the Department centered largely around the maintenance of the collection and the development of plans for remodeling the Reptile House. In connection with the latter, Dr. Oliver visited several of the larger zoos in the East and Middle West to study their reptile house facilities. Many valuable plans and techniques were obtained, and it is hoped that these can be put into effect in the remodeling of our Reptile House early in 1952, if building conditions permit. Because of the inadequacy of the present space in the Reptile House, we have not made an effort to build up the size of the collection. On the contrary, we have had to reduce its size through exchanges with other institutions to avoid overcrowding.

Only two minor physical changes were made in the Reptile House during the year. The oval exhibition cage in the lobby was replaced by two new rectangular cages. These now house interesting African and Australian lizards. The second change was the addition of a safety screen under the guard rail in front of the large Alligator and Crocodile pools, to keep small children from getting in too close contact with the crocodilians.

REPTILES AND AMPHIBIANS - A number of rare species were placed on exhibition for the first time or were again exhibited after many years. The most outstanding specimens were three Colombian Giant Toads

purchased from Rolf Blomberg in July. These large toads--the biggest one as long as the largest toad ever recorded for the Western Hemisphere--make a striking and unusual exhibit. They represent a species new to science, and were described for the first time in Zoologica in December, 1951, under the name Bufo blombergi Myers & Funkhouser. Only four specimens are known, and three of the four are in our collection.

Also new to us were two Bahama Iguanas of a form that was thought to have been exterminated in 1916. Our two specimens were sent to the University of Florida by Mr. George Campbell and were brought to the Zoological Park by Dr. Oliver.

For the first time in more than a decade we exhibited the Caiman Lizard from eastern South America. Two South American Side-necked Turtles are the first that we have had in some twelve years.

Mr. David Fleay sent two large shipments of snakes from Australia. Included were our first specimens of the Carinated Brown Snake, the first specimen of the fast and deadly Australian Brown Snake that we have had since 1917, Australian Copperheads, Tiger Snakes and Red-bellied Blacksnakes. This material enables us to make a very interesting and showy exhibition of the more important venomous snakes of Australia.

Two highlights of the year involved pythons of quite different sizes. The first of these events began in May when we were given ten eggs that had been laid by a female Indian Rock Python en route to an animal dealer, Mr. Henry Trefflich. The eggs were incubated in the Reptile House and hatched on July 20. All but three of the young snakes were exchanged with other zoos. By December our three had more than doubled their length at hatching.

The other python event was the arrival of a seventeen-foot Reticulated Python from Thailand (Siam) as a gift of Mr. Robert Burton, by way of the California Academy of Sciences. Mr. Burton dispatched it to the United States aboard a Norwegian freighter in care of the Captain. The ship was two months in its journey to New York, but Captain Hassel saw to it that the python was well cared for, even to having it force-fed on two occasions. The ship arrived in New York during a dock strike, but the python was unloaded without disturbance from the picket line. Its mouth was in bad condition, but it has been cured and is now doing well in the cage with our smaller, fifteen-foot Reticulated Python.

During 1950 the Department received 268 specimens as gifts, 152 were purchased for display and 58 were received in exchange. Seventy specimens were sent as exchanges to other institutions, but because of the limited space at present, several exchanges-in-return will be held up until we can better accommodate them.

Purchases were kept to a minimum for the same reason, and thus of the 152 specimens received through purchase, only four were obtained during the last quarter of the year.

CENSUS OF REPTILES AND AMPHIBIANS
December 31, 1951

<u>Orders</u>	<u>Species</u>	<u>Specimens</u>
CAUDATA		
Salamanders	3	14
SALIENTIA		
Frogs, Toads	10	26
CROCODILIA		
Alligators, Crocodiles	5	15
SQUAMATA		
Snakes	50	97
Lizards	12	32
TESTUDINATA		
Turtles, Tortoises	<u>38</u>	<u>139</u>
<u>Totals</u>	118	325

Summary: Orders, 5; Species, 118; Specimens, 325

INSECTS - The three main insect exhibits continue to flourish and attract a great deal of attention. The colony of Parasol Ants that Dr. Beebe brought back from Trinidad early in 1950 is going strong. Our Bee Hive was inspected by officers of the Bronx County Beekeepers Association and reported to be in excellent condition. Our Giant Cockroaches are reproducing at a good rate and the colony appears to be increasing. Several specimens were sent to Montana State College for research in nerve physiology.

During the year the Curator gave two talks to the In-Service Teachers Course in the Zoological Park. He also conducted a lecture tour through the Reptile House for the Biology Club of Roosevelt High School and was the principal speaker at the Annual Round-up of the Bronx Valley Boy Scouts in Mount Vernon, New York.

ANIMAL HOSPITAL

Leonard J. Goss, Veterinarian

A REVIEW of the year's activities of the Animal Hospital reveals little that can be called novel. Established clinical and laboratory procedures were followed. Sulfonamides and antibiotics are no longer considered new; they have been accepted universally in the treatment of animal diseases. This is, of course, not to say that all problems have been solved. To specify only one, anesthetics that can readily and satisfactorily be administered to wild animals remain our greatest need. The very wildness of the more difficult subjects, and lack of sufficient numbers of them for wide clinical experience, hamper progress in this field.

Changes in Federal quarantine regulations concerning the importation of wild animals inevitably affect the Zoological Park. The past calendar year was the first under a new regulation of the United States Bureau of Animal Industry, which controls importations related to the animal industry (food-producing animals), requiring quarantine of certain wild bird imports. All birds of the Orders Anseriformes, Galliformes and Columbiformes, must now be quarantined for two weeks immediately upon arrival in the country, and must be accompanied by an acceptable certification that they come from areas in which there have been no known cases of infectious avian diseases for sixty days immediately prior to shipment. The regulation is designed to protect the poultry industry of the country.

The United States Public Health Service is responsible for supervision of animals capable of transmitting disease to human beings. The most important change in its regulations was a relaxing of the laws concerning the importation and interstate movement of psittacine birds. This new policy is a reflection of the low incidence of psittacosis in human beings and the effectiveness of certain antibiotics in treating the disease. The Zoological Park's Veterinarian was called upon for advice in the revision of the regulation.

It might be noted that Federal regulatory problems are today complicated by the increased use of air transport for animals. Shipping by water, because of its slowness as compared to air transportation, was in effect a quarantine in itself.

* * *

The collection suffered three major losses: the Bongo, the Giant Panda and the superb male Lowland Gorilla, "Makoko." The Bongo, in the Zoological Park since 1933 and the only representative of her species presently on exhibition anywhere, died of senile changes on March 23. The tragic drowning of "Makoko" ended our hope of being the first to breed Gorillas in captivity. It was, also, the termination of the first successful attempt to rear a male and female Gorilla together from infancy to adolescence. There were no organic changes to indicate that "Makoko" would not have continued to enjoy good health for years to come. Dr. Earl Engle of the College of Physicians and Surgeons of Columbia University made a detailed microscopic examination of the animal's gonads and found it had attained adolescence. These findings will be reported in the literature, and our only consolation in this loss will be the knowledge thus gained about the much discussed and highly interesting question of the sexual development of the largest of the anthropoids. "Makoko" weighed twenty-eight pounds on arrival at the Zoological Park in September, 1941, at an estimated age of two years. At death on May 13, 1951, at an approximate age of eleven and a half years, he weighed 450 pounds.

The cadaver was sent to Harvard Medical School for comparative anatomical studies. Post-mortem measurements, after removal of the pelt, were:

Height (heel to top of head)	58"
Arm span	92"
Leg length (heel to center of inguinal ligament) ...	26"
Greatest chest circumference	51"

Our sole remaining Giant Panda of two obtained in 1941 died following a convulsion on October 31, just two months short of ten years from the time she arrived in the United States. Inadequate knowledge of the nutritional requirements of Giant Pandas probably accounts for the common occurrence of nervous convulsions and death in these animals in captivity.

Microscopic and bacteriologic examinations of the visceral organs of the Giant Panda failed to reveal a cause of death. Microscopic examination of the brain has not been completed.

"Mambo," a young male Lowland Gorilla received May 22 as a replacement for "Makoko," has progressed well. The mycotic dermatitis with which the animal was affected on arrival responded promptly to treatment. One noteworthy incident occurred during the year. On the morning of June 10, "Mambo" was found with both eyes swollen shut--a startling sight. Despite the relative infrequency of recognized allergic manifestations in animals, this was apparently an allergic reaction to rye bread. It has not recurred since the Gorilla's diet was changed.

Our young female Mountain Gorilla, "Sumaili," was treated for acute protozoan dysentery for six days in April. Emetine hydrochloride and carbarsone were used to control the infection.

On several research projects the Veterinarian acted as consultant with local medical institutions and actively participated in a new project of the Orthopedic Service of the New York University-Bellevue Medical Center. This project concerns a crippling bone disease of human beings. Cooperative research with other institutions was maintained at the normal level.

During the summer a graduate student from Macdonald College of McGill University collected parasites from autopsy material, in an attempt to trace the phylogeny and evolution of the hosts and the relationships of the parasites among themselves.

Ursula Keegan Reinert resigned as Registered Nurse on December 1, following her marriage. Mrs. Reinert had very ably operated the First Aid service and had acted as laboratory technician since April 1, 1950. During the year the First Aid service handled 2,682 cases. The employees' blood bank provided thirteen pints of blood for five employees or members of their immediate families.

One hundred and fifty-nine specimens were dispatched to other research institutions with which we collaborated. An additional 62 specimens--25 mammals, 35 birds and 2 reptiles--went to the American Museum of Natural History.

Birds hospitalized during the year numbered 69 for 2,018 hospital days. One hundred and forty-five mammals were accommodated for 2,898 hospital days.

The mortality tables following require some explanation. "Total in Collection" is arrived at by adding to the census at the beginning of the year all animals acquired by purchase, exchange, gift or born alive. Animals disposed of alive by sale or exchange during the year are not deducted. Contrary to the policy of some zoological gardens, no acclimatization period following birth or arrival is allowed:

MORTALITY TABLES FOR 1951

MAMMALS

<u>Year</u>	<u>Total in Collection</u>	<u>Died</u>	<u>Mortality Percentage</u>
1951	691	104	15.05
1950	697	117	16.78
1949	721	115	15.95
1948	660	95	14.39
1947	<u>709</u>	<u>113</u>	15.93
Totals	3478	544	

Average mortality for past 5 years: 15.64%
 Average mortality for past 15 years: 19.50%

BIRDS

<u>Year</u>	<u>Total in Collection</u>	<u>Died</u>	<u>Mortality Percentage</u>
1951	1617	250	15.46
1950	1816	283	15.58
1949	1645	248	15.07
1948	1763	261	14.80
1947	<u>1991</u>	<u>276</u>	13.86
Totals	8832	1318	

Average mortality for past 5 years: 14.92%
 Average mortality for past 15 years: 15.84%

DEPARTMENT OF EDUCATION

Herbert J. Knobloch, Associate in Charge
Anne Orth Epple, Assistant
Elizabeth P. Jacob, Assistant

THE YEAR 1951 will be remembered in this Department as a year for breaking records, several of them in regard to organized groups visiting the Zoological Park. The totals for these visiting groups are as follows:

Number of Schools and Organizations	1,952
Number of Classes and Organized Groups	2,595
Total School/Group Visitors	107,184

Both the school and visitor figures are new records. The best previous year was 1949 with totals of 1,805 and 104,035 respectively. As far as the number of classes is concerned, 1949 is still the record year with 2,682.

The best month was May, with 575 schools and a visitor total of 39,597, also new month records. The best month previously was June of 1949 with 36,852. June of 1949, however, still holds the record for the number of classes visiting the Park in a single month, with 900, just ten more than the 890 classes that visited the Park in May of this year. It must be noted, however, that the 1949 figures include attendance by groups to the Farm-in-the-Zoo, whereas the figures for 1951 are for the Zoological Park only.

SCHOOL LECTURE SERVICE - Miss Elizabeth Jacob visited 96 schools and organizations and gave 277 talks, lecturing to 30,626 children, another record. This figure is a great increase over the previous high of 1948 when Mrs. Ruth Dauchy Guiler and Mrs. Anne Orth Epple lectured to 23,851 children. Miss Jacob usually illustrated her talks exclusively with live animals, but occasionally supplemented the living material with slides and films. Most of her programs were confined to children of kindergarten age through the sixth grade or corresponding age levels. The de-

cision made two years ago to discontinue visits to Nursery Schools and Day Care Units because requests from these organizations interfered with the regular school lecture schedule, was reversed, and we undertook to fulfill requests from such organizations when schools were closed and time permitted. Consequently a few of these were visited during the summer. Many school day camps and Brownie and Girl Scout troops were also visited during the season.

GUIDED TOURS - Guided tours for school classes and other organized educational groups numbered 97 for 3,369 persons. Eight Behind-the-Scenes tours were conducted for 42 members of the Zoological Society and their guests.

QUESTION HOUSE - Because of the construction of the new Cafeteria, the opening of the Question House in the same building was delayed until September 11. It closed on November 12. A new heating system and an emergency alarm bell were installed. Despite the fact that it was open only two months and one day, Question House had 13,032 visitors who asked 3,917 questions. The questions break down thus:

Miscellaneous animal questions .	2,850
Telephone inquiries	47
Inquiries by letter	12
Questions requiring research ..	41
Platypus questions	100
Directional	<u>867</u>
	3,917

Before and after its open period, Question House received 165 telephone calls and 20 letter inquiries.

Lectures - Throughout the course of the year the Department's staff gave 33 lectures to audiences totalling approximately 4,200 persons, and participated in one radio program and two television shows.

VISUAL AIDS - Work continued during the year on the Society's film project and "The Younger Generation" was completed with a sound track. "The World of Water," originally produced for use at the Society's membership meeting and in conjunction with the Aquarium Fund Campaign, was re-edited slightly to make it a general film on fishes, with sound.

The cutting of "Strangers from Afar" (Mammals) was completed and it is now ready for recording.

Our films were rented 140 times and were seen by 13,329 persons. Twelve prints of several of our films were sold, as well as fifty 2 x 2 Kodachrome slides. Staff officers used films on 30 occasions, and there were 21 preview requests and 11 special showings outside the Park.

MISCELLANEOUS - Mrs. Anne Orth Epple left the department on December 31.

When time allowed, additional animal sounds were recorded on our magnetic tape recorder and added to our library of animal voices.

Mr. Knobloch again supervised the two In-Service courses for elementary school teachers, "Materials and Methods in the Use of the New York Zoological Park (Bronx Zoo) in Elementary Education," given at the Park in the spring and fall. The popularity of the course is attested by a registration in the fall term of 83 teachers, about twenty more than we can comfortably accommodate.

Three courses about animals, with emphasis on mammals, were given for Girl Scout Leaders. They were offered one day a week for five weeks and consisted of guided tours, film showings and lectures. They served to instruct leaders, who in turn prepared Girl Scouts working for their Animal Merit Badges. Arrangements for starting the courses were made by Mrs. Ross F. Nigrelli. A condensed course which consisted of a special guided tour lasting a full day, was also given for prospective Brownie and Girl Scout leaders.

Two new bibliographies were prepared, the first a comprehensive one on natural history and the second, intended especially for teachers, on publications concerning the care, housing, handling, feeding and breeding of animals kept in the classroom and home as pets.

Mr. Knobloch continued as Chairman of the Zoological Park's Safety Committee, and together with Mr. Howley of the Aquarium, Secretary of the Committee, attended the four-day conference on the New York City Accident Control Program held in the Municipal Building in November.

PUBLICATION AND PHOTOGRAPHY

William Bridges, Curator
Dorothy Reville, Assistant
Sam Dunton, Photographer

OVER THE YEARS a pattern has been evolved wherein motion pictures made for first exhibition before the Zoological Society's membership at its January meetings are subsequently re-edited and provided with a sound track, for inclusion in our sales and rental film library. That pattern is now being sharpened, by more careful planning of the year's film program, so that pictures made for the membership can pass directly into the library with a minimum of editing --usually a mere shortening to single-reel length-- and the addition of a sound track.

Of the two new pictures made by Staff Photographer Dunton in 1951, "The Kindergarten Class" will be taken over unchanged by our Education Department, but "Let's Go to the Zoo!" will be broken up and apportioned among two or three other pictures now being put together.

Mr. Dunton thoroughly revised a film of several years ago, "The Younger Generation," picturing some of the more unusual of our baby animals, and it now has been given a sound track and is ready for distribution. With lesser revision, "The World of Water" was completed for the film library. This single-reel picture, first shown at the membership meeting in January, 1951, is certainly the most beautiful presentation of our Aquarium collection we have ever made.

All these films are, of course, 16 mm., in color, and with sound. Black-and-white motion pictures still have their place, however, and a short film was made of Keeper Reilley wrestling with Oka, our large female Gorilla, for use in a television program of the Lincoln Park Zoo in Chicago.

Mr. Dunton also made a motion picture record, in color, of a research project on color discrimination in Galapagos Tortoises. This may later be incorporated in a film on animal behavior research.

In the still photography section, 351 negatives

by Mr. Dunton were cataloged and 102 glass negatives made many years ago by the late Elwin R. Sanborn were acquired from his estate and cataloged. We now have approximately 29,000 negatives. One major series of Mr. Dunton's negatives, 83 in all, covered the hatching of Horseshoe Crabs.

Seven hundred and seventy-eight prints were sold to students, publishers, artists and the like, and 1,717 prints were made for our own use--for publication in our magazines, for exhibition, publicity, and so on. This number includes X-ray transparencies, label transparencies, slides and copy negatives.

In the publication section, a booklet on the Coyote was edited and published, booklets on Elk and Moose were seen through the press for the Jackson Hole Wildlife Park and a new series of 12 black-and-white postcards was issued. Mrs. Reville handled the layout of all issues of Animal Kingdom. Under her direction, an index has been prepared of all existing halftones used in the Society's publications since the beginning of the century.

In the Print Shop, 435 jobs passed through our presses and of these 165 were for new labels. This is a remarkably small number, attributable to the fact that our cage labels are lasting much longer since they have been printed on thick "Rainbow Board," obtained from a builder's supply house. But if label printing declined, the presses were not idle; 66 orders entailed long runs with a total of 286,440 impressions as against last year's 184,368 impressions.

Mr. Atz of the Aquarium staff and Mr. Bridges devoted considerable time to the reorganization of the Society's library. More than a hundred cartons of unwanted publications were sent to other libraries.

Twenty-three papers, to a total of 282 pages, were published in the quarterly parts of Zoologica. Volume 36 contained the following:

Part 1. April 20, 1951.

1. Migration of Nymphalidae (Nymphalinae), Brassolidae, Morphidae, Libytheidae, Satyridae, Riodinidae, Lycaenidae and Hesperidae (butterflies) through Portachuelo Pass, Rancho Grande, north-central Venezuela. By William Beebe, Plates I & II.
2. Deep-sea fishes of the Bermuda oceanographic ex-

- peditions. Family Paralepididae. By Robert R. Harry. Text-figures 1-9.
3. Miscellaneous notes on the eggs and young of Texan and Mexican reptiles. By John E. Werler. Plates I-VII.
 4. Sexual behavior in the guppy, Lebistes reticulatus (Peters). By Eugenie Clark & Lester R. Aronson. Plates I-VII; Text-figures 1 & 2.

Part 2. August 20, 1951.

5. Eastern Pacific expeditions of the New York Zoological Society. XLIII. Mollusks from the west coast of Mexico and Central America. Part X. By Leo George Hertlein & A. M. Strong. Plates I-XI.
6. Spontaneous neoplasms in fishes. V. Acinar adenocarcinoma of the pancreas in a hybrid platyfish. By Ross F. Nigrelli & Myron Gordon. Plates I-VIII; Text-figure 1.
7. Genetics of Platypoecilus maculatus. V. Heterogametic sex-determining mechanism in females of a domesticated stock originally from British Honduras. By Myron Gordon. Plates I & II; Text-figure 1.
8. Sex determination in Platypoecilus maculatus. I. Differentiation of the gonads in members of all-male broods. By Walter Chavin & Myron Gordon. Plates I-IV; Text-figures 1-3.
9. Sex determination in Platypoecilus maculatus. II. History of a male platyfish that sired all-female broods. By Myron Gordon & Olga Aronowitz. Plates I-IV; Text-figure 1.

Part 3. October 20, 1951.

10. Notes on some New York oribatid mites. By Howard George Sengbusch. Text-figures 1-16.
11. Response of a spontaneous fish lymphosarcoma to mammalian ACTH. By Priscilla Rasquin & Ethel Hafter. Plate I.
12. A study of the social behavior of a captive herd of giant tortoises. By Llewellyn T. Evans & John V. Quaranta. Text-figures 1-4.
13. A new genus and species of Lithosiinae (moths) from Rancho Grande, north-central Venezuela. By Henry Fleming. Text-figure 1.
14. Western Atlantic tonguefishes with descriptions of six new species. By Isaac Ginsburg. Plates I-III.

15. Agglutinins and agglutinogens in the blood of wild animals. By Henry Vogel.
16. Parasites of fish in the upper Snake River drainage and in Yellowstone Lake, Wyoming. By Ralph V. Bangham.

Part 4. December 28, 1951.

17. Report on a collection of spiders and harvestmen from Wyoming and neighboring states. By Herbert W. Levi & Lorna R. Levi. Text-figures 1-50.
18. A spontaneous epithelioma in the platyfish, Xiphophorus (Platypoecilus) variatus. By Olga Aronowitz, Ross F. Nigrelli & Myron Gordon. Plates I & II; Text-figures 1 & 2.
19. Migration of day-flying moths through Portachuelo Pass, Rancho Grande, north-central Venezuela. By William Beebe & Henry Fleming. Plate I.
20. Migration of insects (other than Lepidoptera) through Portachuelo Pass, Rancho Grande, north-central Venezuela. By William Beebe.
21. A new fish of the genus Gambusia from southern Veracruz, Mexico, with a discussion of the tribe Gambusiini Hubbs. By Donn Eric Rosen & Myron Gordon. Text-figures 1-8.
22. Epidermal fin tumors in the gobiid fish, Bathygobius soporator. By William N. Tavalga. Plates I-V.
23. A new giant toad from southwestern Colombia. By George S. Myers & John W. Funkhouser. Plate I.

Animal Kingdom was published in the six regular numbers. Volume LIV contained 192 pages.

COMPTROLLER'S DEPARTMENT

Herbert F. Schiemann, Comptroller

THE WORK of the Comptroller's Department tended to increase considerably during the year, a condition induced by the greater volume of sales, the extension and, later in the year, the addition of a group insurance plan which was accepted by the required majority of employees. Much extra work was handled by the department in preparing data for Griffenhagen & Associates, the concern employed by the Mayor's Committee on Management Survey to prepare a classification and compensation study for the City of New York. A new project undertaken by this department during the year was revision of the payroll system. A well known labor-saving payroll system was adopted, and the essential forms were printed and in readiness for use on January 1, 1952.

The Comptroller's Department is continuing its efforts to improve its control over the many operations which involve the receipt and expenditure of funds. The steady growth of our operations requires constant attention to this function.

We have been confronted with many new and pressing problems, but with the help of our loyal and efficient office staff, the use of new methods and installation of modern labor-saving devices, we have been able to meet each new situation successfully.

CONSTRUCTION AND MAINTENANCE

Quentin Melling Schubert, Superintendent

SEVERAL CONSTRUCTION JOBS were accomplished in 1951, two of them by outside contractors working under the supervision of this Department. The first entailed enclosing and remodelling the former Picnic Pavilion to create a new Cafeteria, complete with stainless steel kitchen and serving counters. Installation of heating units has made the Cafeteria suitable for year-round operation.

The second project included remodelling of the moats and yards of the Great Apes House. The sheer

walls fronting the yards were replaced by graduated steps, making it possible to use a water depth of only eighteen inches instead of the former maximum of six feet. The wing walls separating the yards were extended across the moat to provide complete barriers.

Other construction jobs were done by our own force, and some subcontractors. The southeast elephant yards, following the removal of the iron fences, were reconstructed with dry moats and stone walls similar to those of the southwest area. At one point a re-inforced concrete beam was constructed, spanning the roots of a tree and supporting the new stone wall, in order to preserve one of the oldest oaks in the Park.

The kitchen in the Large Bird House was completely remodelled. The walls and floors were replaced with tile and the kitchen equipped with new stainless steel.

In the basement of the Administration Building, a new library has been completed, making it possible to house all books and periodicals under one roof.

The Entrance Maps and Stockade of the African Plains were destroyed in the storm of November, 1950. All have been reconstructed and replaced.

The Lion House entrance doors, old and dangerous, were removed and replaced with new pivot doors.

Two new boilers were purchased. The first has been installed and is in operation in the Aquatic Bird House; the second is in readiness for installation at the end of the present season.

The drainage lines from the Zebra Corrals were replaced and rerouted, and all the yards re-surfaced for proper drainage.

The balustrade along the east walk at Rainey Gate was destroyed during the storm, and has been replaced.

Seven large elms have been planted in the Rainey Gate approach, replacing those lost in the hurricane. Rhododendrons planted more than forty years ago have also been replaced, as well as many trees and shrubs lost or damaged in the severe storms.

The extensive repainting of the Zoo in the new color schemes is now in progress.

Maintenance and routine work orders, more than 2,500 in number, were executed by the Department.

FACILITIES DEPARTMENT

Edward Kearney, Manager of Restaurants
Edward Quinn, Assistant Manager

TOO LATE to be tested at its full capacity, a new Cafeteria was opened on November 18 after the approach of winter had caused the number of visitors to dwindle. Before the end of the year, however, there were a sufficient number of days with attendance between 5,000 and 25,000 to indicate that next summer the Cafeteria will be able to cope with really peak crowds.

Centrally and pleasantly located as it is, at the crossroads of major north-south and east-west routes through the Zoological Park and on the bank of the Wildfowl Pond, the Cafeteria will certainly be called upon to serve an enormous number of meals each day during the busy seasons, and with this in mind all operations have been mechanized and simplified as much as possible. Utility trucks, mop pails, and refuse containers have been put on wheels, the glazed-tile kitchen contains electrically-controlled stainless steel dish- and silverware-washing and sterilizing machines, and the service counter has been laid out, as is usual in cafeterias, in assembly line fashion.

In short, the new Cafeteria incorporates every modern labor-saving, quick-serving, attractive-display device that is available and is a most important addition to the public services of the Zoological Park.

MISCELLANEOUS OPERATIONS AND SERVICES

CHILDREN'S ZOO - The Children's Zoo began its eleventh season on April 7, as usual under the supervision of Mrs. Corrine Dalsgaard. Excellent weather conditions through most of the summer resulted in a record attendance of 384,123, exceeding the best previous figure by 26,822.

RIDING TRACKS - Dromedaries, Llamas and Donkeys, ably operated by Riding Master Henry Bartels, brought

pleasure to 231,434 children. This figure exceeds by 33,131 the best of Mr. Bartels's previous excellent totals.

Rides at the Pony Track under Ponymaster Edmond Foran numbered 215,841, an increase of 1,476 over 1950.

TRACTOR TRAINS - Rides numbered 571,447 in 1951, against 528,261 in 1950.

FARM-IN-THE-ZOO - The Farm-in-the-Zoo was again unable to open because of Parkway construction. Farm Superintendent Nelson Miller remained in residence on the property, however. Basic breeding stock was maintained, and animals from the Children's Zoo were wintered and tractor trains stored at the Farm. Emphasis was placed on the production of eggs and poultry, and fresh eggs were supplied for custards for the Duck-billed Platypuses. Other foodstuffs were supplied to the Facilities Department Commissary.

Production at the Farm was: Wool, 149 pounds; Pork, 5,180 pounds; Lamb, 130 pounds; Poultry, 1,827½ pounds; Eggs, 870½ dozen.

SUMMARY OF ATTENDANCE

ZOOLOGICAL PARK

<u>Month</u>	<u>1951</u>	<u>1950</u>
January	59,968	74,909
February	134,099	75,392
March	167,307	129,500
April	308,275	224,154
May	317,915	356,613
June	270,515	293,054
July	360,368	344,400
August	342,355	323,366
September	261,637	237,367
October	171,273	242,956
November	119,634	122,525
December	<u>70,125</u>	<u>54,703</u>
	2,583,471	2,478,939
Total visitors from		
November 9, 1899, to		
December 31, 1951		112,067,393

THE AQUARIUM

Christopher W. Coates, Curator and Aquarist
James W. Atz, Assistant Curator
Ross F. Nigrelli, Pathologist
Myron Gordon, Geneticist

ALTHOUGH THERE WAS no apparent advance toward the new Aquarium in 1951--the international situation remaining as dislocating as ever--definite progress in the development of operational techniques and inter-institutional relations was made during the year. In addition, the Board of Estimate of the City of New York on December 20 approved the expenditure of \$80,000 for the purchase of a parcel of land in the northwest corner of the future Aquarium's site. Most of the property for the site had already been assembled some time ago.

The search for new and better ways of doing things goes on everywhere more or less continuously, but with us it is doubly motivated; any improvement that can be brought about in our present relatively small exhibition in the Lion House may show the way toward improving our projected institution at Seaside Park. After considerable deliberation, a new label has been designed for our exhibits, and we are now in the process of rewriting the great majority of our labels, checking, augmenting and recasting their text. The problem of providing the public with an illustrated label, making possible the ready identification of exhibits, as well as an informative one, containing interesting facts in legible type, at first seemed well-nigh insoluble because of limitations of space. As many as a dozen different species of tropical fishes may be exhibited in a single small tank, which to the public presents a glass rectangular area of only one and one-half square feet, set in a masking wall. Moreover, the high cost of colored illustrations made their use impossible, and the factors of flexibility and durability also had to be taken into account. The resolution of the problem was in large measure the result of the efforts of our Print Shop and artist Lloyd Sandford, who managed to catch the critical

characteristics of each fish in his black-and-white drawings. There is of necessity little text on each label, but this deficiency has been offset by labels devoted entirely to informative text, which will be interspersed among those whose primary purpose is identification.

A distinctly different kind of label was installed on the Mudspringer exhibit. This is one of the most interesting of fishes, spending most of its time on land. A suitable enclosure for it was necessarily somewhat drab, and since the fish itself is "happy" only if its colors match its surroundings, the result was a subdued exhibit not likely to be noticed by the visitor. By using a large, bright label with a large drawing of the fish and lively text, we found that visitors stopped and examined it closely. For exhibits which are not sufficiently colorful, spectacular or noticeable by themselves, the "placard" type of label seems to be very successful.

Since there are few commercial channels through which living fish may be obtained, it behooves public aquariums to make as many contacts as possible through which specimens may be obtained by exchange or purchase. During the last few years Curator Coates has been especially active in establishing and strengthening our relations with various sources of supply from which we hope to procure living exhibits for the new Aquarium. In November, while attending the annual meeting of the American Institute of Park Executives at Miami, he visited the Municipal Aquarium at Key West, Marineland near St. Augustine, the Theatre of the Sea at Islamorada and Ross Allen's Reptile Institute at Silver Springs, as well as all of the available professional salt water fish collectors. Curator Coates also organized and took part in a discussion on aquariums held by the American Association of Zoological Parks and Aquariums during the Miami meetings.

Another aspect of these vital outside relations concerns the aid that we are able to furnish sister institutions and the good will thus engendered. During the year Curator Coates was visited by representatives of the Taronga Park Aquarium in Sydney, the Audubon Park Aquarium in New Orleans and the Richard Friedrich Aquarium in San Antonio, who were seeking advice on technical matters. He was also consulted by the Taraporevala Aquarium in Bombay, the Amsterdam Aquarium and the Steinhart Aquarium in San Francisco. Information on the construction and

management of proposed public aquariums was sought by visiting architects and engineers from Honolulu, Hawaii; La Guaira, Venezuela; Cartagena, Colombia; and Bergen, Norway. Similar information was also furnished to organizations in Vancouver, Nice and the Transvaal.

Earthworms, crayfish and frogs to feed the Duck-billed Platypuses were collected or maintained at the Aquarium as before. An interesting by-product of this has been the discovery among those collected or purchased by us of several species of earthworms new to the United States.

EXHIBITIONS - A Tiger Catfish (Pseudoplatystoma fasciatum), acquired by purchase, was the outstanding acquisition during the year. This strikingly-marked South American species had never before been exhibited here.

Other important purchases included Mudspringers, Lion-head Goldfish, Chocolate Gouramis, Clown Loach, two species of so-called Flying Barbs and a Pirambeba (Serrasalmus rhombeus).

The Bureau of Inland Fisheries of New York State donated about 800 freshwater fishes, collected at Haverstraw, New York, including Yellow Perch, Golden Shiners and various species of sunfishes.

From Weber's Tropical Fish Company we received six specimens of Haimara (Hoplias malabaricus), and Mr. Joseph Mintzer collected a number of small marine species for us at Rockaway.

RESEARCH - With the death of Dr. George Milton Smith, Research Associate in Pathology at the Aquarium, the Society lost a great and good friend. His loss was especially felt by the Aquarium. Dr. Smith first became interested in the Society through the great potentialities for scientific work that he saw in the New York Aquarium, at that time located at the Battery. He was an unfailing source of inspiration and assistance in every sphere of research, including those outside his own immediate interests. It was through his efforts that an extensive program of investigation of abnormal growths of fishes was instigated, leading eventually to the establishment of the Genetics Laboratory and the present position we enjoy in the field of comparative oncology.

A total of nearly \$26,000 was granted directly to us during the year for the prosecution of research in our Genetics Laboratory, in addition to an even greater amount to be devoted to neurophysi-

ological and antimetabolite investigations, in which our staff participates. From the Federal Securities Agency, Public Health Service, National Institutes of Health, \$23,940 was received in continued support of Dr. Gordon's studies on normal and atypical pigment cell growth and related problems, covering the eighteen-month period from July 1, 1951, to December 31, 1952. The Anna Fuller Fund contributed \$750 toward the expenses of the third pigment cell growth conference, and \$500 to enable Dr. Recai Ermin of the University of Istanbul, Turkey, who has been working in the Genetics Laboratory since July, 1951, to extend his investigations through the first two months of 1952. A grant of \$750 from the American Philosophical Society for studies on the genetics and speciation of Platyfishes and Swordtails was also received.

Our Genetics Laboratory has been located in the Whitney Wing of the American Museum of Natural History since the fall of 1941, and we are deeply indebted to this institution, and especially to the Department of Birds and the Department of Animal Behavior, for the many facilities and courtesies freely extended to us during the past decade.

A new type of neurophysiological research employing Electric Eels has been initiated by a group of investigators at the College of Physicians and Surgeons, working in collaboration with Curator Coates. Previously, measurements of the eel's electrical activity were made on the whole fish and then correlated with biochemical analyses of electric tissue; methods have now been developed permitting the use of tiny sections of this tissue--some consisting of only three of the several thousand electric plates that make up each electric organ. This new approach has already proved of the greatest value in analyzing the effects of various physical and chemical factors on the functioning of electric and nerve tissue, thus providing new insights into the fundamental electrical manifestations of life.

In the Zoological Park's Biophysics Laboratory, which is largely supported by Mr. De Forest Grant, a statistical study of the variation in the voltage per electroplax, produced by Electric Eels of various sizes and stages of sexual maturity, is under way. Data so far obtained by Curator Coates and Dr. M. Vertner Brown of City College indicate that there are at least two critical periods in the life and growth of the eel at which large changes in its ability to produce electricity occur. The problem

of how this fish avoids electrocuting itself is also being investigated. The peculiar clouding over of the eyes of Electric Eels--which occurs naturally in all individuals more than about six inches long, and which practically blinds them--and the relation of this condition to the electric discharges of the fish is being studied by Dr. James Miles O'Brien and Curator Coates.

The work of Dr. Nigrelli has centered around abnormal growths in fishes. During the year studies were made on thyroid tumors in marine fishes, on a spermatocytoma from an African Lungfish (the first of this type of tumor ever to be recorded from a fish) and on several other kinds of tumors, reports of which are listed in the section devoted to publications of the staff. Investigations on lymphocystis disease, especially in the Striped Bass, were continued.

For some time Dr. Nigrelli has been investigating antimetabolites, those strange substances having the power to interfere with specific chemical processes in the living body. Under his direction, Mr. Samuel Bieber has discovered that the frog's egg is an excellent experimental subject for the analysis of the effects of various antimetabolites on growth and development. These studies give promise of providing a new means of determining the chemical changes which occur during embryological development.

The Third Conference on the Biology of Normal and Atypical Pigment Cell Growth was held in the Administration Building in the Zoological Park on November 15, 16 and 17. The Conference was organized by Dr. Gordon and sponsored by the Society. Nearly one hundred research workers from all parts of the country attended to hear the 22 papers presented by authorities in the field of pigment cell biology. The reports included some outstanding clinical studies on melanomas--perhaps the most deadly of all cancers in human beings.

At the Genetics Laboratory a number of different lines of research, all directly or indirectly concerned with the biology of cancer, were pursued. Dr. Gordon completed the genetic analysis of another gene modifying the growth of pigment cells in the Platyfish. Drs. Olga Aronowitz and Gordon analyzed the relationship of gonads in hybrid fishes to abnormal pigment cell growth and, together with Miss Martha Edgar, studied several different types of thyroid tumors in various strains of laboratory fishes. Drs. Ermin and Gordon are investigating the

regeneration process following the amputation of fish melanomas. Mr. Marcus is making a detailed analysis of the morphology of normal and atypical pigment cells.

Dr. Gordon spent approximately a month in Honduras and succeeded in collecting living specimens of a new geographical strain of Swordtail, which were brought back to the laboratory. During the year Mr. Donn E. Rosen studied preserved fishes collected on this expedition and also specimens from British Honduras and southern Mexico. To facilitate this work two trips were made to the Museum of Zoology at the University of Michigan. The United Fruit Company and the Standard Fruit Company extended vital facilities and services to Dr. Gordon in Honduras.

Mr. Atz completed a review of narial breathing in living fishes correlated with the evolution of internal nares in vertebrates, which was accepted as his Master's thesis by New York University.

COLLABORATION - Collaborators working with us during the year were:

Drs. David Nachmansohn, Harry Grundfest and Irwin B. Wilson, Department of Neurology, College of Physicians and Surgeons, Columbia University.

Dr. Mario Altamirano-Orrego, Catholic University of Chile, Santiago, and Department of Neurology, College of Physicians and Surgeons, Columbia University.

Dr. M. Vertner Brown, College of the City of New York.

Drs. Horace W. Stunkard and Harry Charipper, New York University.

Dr. Eli D. Goldsmith, New York University Dental College.

Dr. Alexander Haddow, Royal Cancer Institute, London.

Dr. Aubrey Gorbman, Barnard College, Columbia University.

Dr. Sophie Jakowska, College of Mount St. Vincent, New York.

Dr. Alfred Perlmutter, Conservation Department, State of New York.

Drs. Caryl P. Haskins, Seymour Hutner and Luigi Provasoli, Haskins Laboratories, New York.

Dr. Helen Vishniac, Queens College and Haskins Laboratories.

Miss Francesca LaMonte, Drs. Charles M. Breder, Jr.,

Lester R. Aronson and T. C. Schneirla, American Museum of Natural History.
Dr. James R. Westman, New Jersey Agricultural Experiment Station, Rutgers University.
Dr. Daniel Merriman, Bingham Oceanographic Laboratory, Yale University.
Dr. James Miles O'Brien, Yale University and New York Eye and Ear Infirmary.
Dr. William N. Tavolga, College of the City of New York.
Dr. Alfred Angrist, Jewish Memorial Hospital and Queens General Hospital.
Dr. Abner I. Weisman, Jewish Memorial Hospital and Metropolitan Hospital, New York.
Dr. G. E. Gates.

Under the sponsorship of Drs. Nigrelli or Gordon, Messrs. Myron Jacobs, Henry Vogel and James W. Atz received their Master of Science degrees in the Graduate School of Arts and Sciences, New York University. The following candidates are at present working under Drs. Nigrelli or Gordon for advanced degrees:

Mr. Sheldon Aaronson, Brooklyn College and College of the City of New York.
Mr. James W. Atz, New York Zoological Society.
Mr. Samuel Bieber, Wellcome Research Fellow.
Miss Jean Copperthwaite, Haskins Laboratories, New York.
Mrs. Sylvia Greenberg.
Miss Ethel Hafter, American Museum of Natural History.
Miss Patricia Kadow, College of Saint Elizabeth, Elizabeth, N. J.
Mr. Thomas J. King, Institute for Cancer Research, Philadelphia.
Mr. Theodor R. Marcus, Sloan-Kettering Institute, New York.
Miss Patricia E. Rice, New York Zoological Society.
Mr. Alan A. Rubin.
Sister Talitha-Meredith, O. P., Bishop McDonnell Memorial High School, Brooklyn.
Mr. Henry Vogel, Jewish Memorial and Willard Park-er Hospitals.
Mr. Marvin Weinstein, Squibb Pharmaceutical Company, Inc.

Dr. Gordon gave his course on the genetics of fishes, as in previous years.

Technical assistance and/or living aquatic speci-

mens were supplied to National Cancer Institute, U.S. Public Health Service; the College of Physicians and Surgeons, Columbia University; University of Chicago; University of North Carolina; University of Michigan; New York University; U.S. Navy Electronic Laboratory, Pt. Loma, California; Newark Museum, Newark, New Jersey; and the State of Maine. Cooperation with the Department of Marine and Aviation, New York City; the Federal Security Agency, Pure Food and Drug Administration; the Department of Health, New York City; the Department of Interior, Fish and Wildlife Service; and the Conservation Department, State of New York, has been close as in previous years.

PUBLICATIONS - The following scientific and popular articles by members of the staff appeared during the year:

Mr. Coates

- The Kick of an Electric Eel. Pp. 327-338 of "Readings for Comprehension," edited by Benfield Press-ey and Robert M. Bear. Scribner's, New York.
- Tropical Fish. (Trichogaster pectoralis). Fish Culturist, Vol. 30, No. 8, pp. 58-59.
- Antibiotics and Fish Diseases. Aquarium Journ., Vol. 22, No. 5, pp. 99-100.
- Tropical Fish. (Chrosomus erythrogaster). Fish Culturist, Vol. 30, No. 10, pp. 75-76.
- "Tropical Fishes as Pets." English Edition. xi, 226 pp. Jonathan Cape, London.
- The Care of Turtles and Small Alligators. Second, revised edition. New York Zoological Society, 12 pp.
- Weekly column on fishes in the New York World Telegram and Sun continued for twenty-first year.

Mr. Atz

- The Functions of. Plants in Aquaria. The Dominion Aquarist and Pondkeeper (Christchurch), Vol. 9, No. 5, pp. 51-52; No. 6, pp. 63-64. (1950-1951).
- It Swims Upside Down. Animal Kingdom, Vol. 54, No. 1, pp. 18-21. Science Digest, Vol. 29, No. 5, pp. 39-42. Aquarium Journ., Vol. 22, No. 6, pp. 110-113.
- Sightless Cave Fishes from the Bas Congo. Aquarist and Pondkeeper, Vol. 15, No. 12, pp. 236-237. Aquarium Journ., Vol. 22, No. 11, pp. 221-224.
- Strange Fish Lures. Aquarium Journ., Vol. 22, No. 4, pp. 70-72.

- A Congo Characin New to Aquarists. Aquarium Journ., Vol. 22, No. 5, pp. 101-102.
- It's a Characin, But... Animal Kingdom, Vol. 54, No. 4, pp. 121-122.
- Fishes that Look Like Plants. Animal Kingdom, Vol. 54, No. 5, pp. 130-136.
- The Coyote Reappraised. Animal Kingdom, Vol. 54, No. 5, pp. 154; 159.

Dr. Nigrelli

- Maladies of Small Tropical Fishes. Aquarist and Pondkeeper, Vol. 16, No. 6, pp. 119-120.
- The Invasion and Cell Replacement of One Pigmented Neoplastic Growth by a Second, and More Malignant Type in Experimental Fishes. With Sophie Jakowska and Myron Gordon. British Journ. Cancer, Vol. 5, No. 1, pp. 54-68.
- Spontaneous Neoplasms in Fishes. V. Acinar Adenocarcinoma of the Pancreas in a Hybrid Platyfish. With Myron Gordon. Zoologica, Vol. 36, Pt. 2, pp. 121-125.
- A Spontaneous Epithelioma in the Platyfish Xiphophorus (Platyopocilus) variatus. With Olga Aronowitz and Myron Gordon. Zoologica, Vol. 36, Pt. 4, pp. 239-242.
- Lip Tumors in Fishes Kept in Captivity. Cancer Res., Vol. 11, No. 4, p. 272. Abstract.
- Comparative Effects of Pyridoxine Deficiency and Inanition on Testosterone Action in Mice. With E. D. Goldsmith. Anat. Rec., Vol. 109, No. 2, pp. 110-111. Abstract.
- Three Phenotypically Similar Pigment-cell Tumors with Three Different Genotypes. With Myron Gordon and Sophie Jakowska. Cancer Res., Vol. 11, No. 4, p. 252. Abstract.
- Histochemical Studies on the Blood of Platyfish, Swordtail, and their Hybrids. With Sophie Jakowska and Myron Gordon. Cancer Res., Vol. 11, No. 4, pp. 259-260. Abstract.
- Studies on Colpoda. I. Some New Observations on the Life Cycle. With Morton Padnos and Sophie Jakowska. Proc. Amer. Soc. Protozoologists, Vol. 2, pp. 3-4. Abstract.

Dr. Gordon

- How the Bleeding-heart Platy Was "Invented." Animal Kingdom, Vol. 54, No. 2, pp. 43-46. Aquarium Journ., Vol. 22, No. 8, pp. 147-151. Aquarist

- and Pondkeeper, Vol. 16, No. 6, pp. 122-123.
- Red Wagtail Swordtails. The Aquarium, Vol. 20, No. 6, pp. 135-137.
- A Strange New Killifish. Aquarist and Pondkeeper, Vol. 16, No. 5, pp. 93-94.
- Genetics of Platypoecilus maculatus. V. Heterogametic Sex-determining Mechanism in Females of a Domesticated Stock Originally from British Honduras. Zoologica, Vol. 36, Pt. 2, pp. 127-134.
- The Variable Expressivity of a Pigment Cell Gene from Zero Effect to Melanotic Tumor Induction. Cancer Res., Vol. 11, No. 9, pp. 676-686.
- How Animals Get their Names. Natural History, Vol. 60, No. 8, pp. 370-375.
- Platypoecilus now Becomes Xiphophorus. The Aquarium. Vol. 20, No. 11, pp. 277-279.
- A Loan Repaid with Interest. Animal Kingdom, Vol. 54, No. 6, pp. 173-174.
- Irsi Tumorler. With Curt Kosswig. Biologi (Istanbul), Vol. 1, No. 2, pp. 66-73. (1950).
- Genetics of Species Differences in the Morphology of the Male Genitalia of Xiphophorin Fishes. With Donn E. Rosen. Bull. Amer. Mus. Nat. Hist., Vol. 95, Art. 7, pp. 409-464.
- Spontaneous Thyroidal Tumors in the Swordtail Xiphophorus montezumae. With Aubrey Gorbman. Cancer Res., Vol. 11, No. 3, pp. 184-187.
- The Invasion and Cell Replacement of One Pigmented Neoplastic Growth by a Second, and More Malignant Type in Experimental Fishes. With R. F. Nigrelli and Sophie Jakowska. British Journ. Cancer, Vol. 5, No. 1, pp. 54-68.
- Spontaneous Neoplasms in Fishes. V. Acinar Adenocarcinoma of the Pancreas in a Hybrid Platyfish. With R. F. Nigrelli. Zoologica, Vol. 36, Pt. 2, pp. 121-125.
- Sex Determination in Platypoecilus maculatus. I. Differentiation of the Gonads in Members of All-male Broods. With Walter Chavin. Zoologica, Vol. 36, Pt. 2, pp. 135-145.
- Sex Determination in Platypoecilus maculatus. II. History of a Male Platyfish that Sired All-female Broods. With Olga Aronowitz. Zoologica, Vol. 36, Part 2, pp. 147-153.
- A Spontaneous Epithelioma in the Platyfish Xiphophorus (Platypoecilus) variatus. With Olga Aronowitz and R. F. Nigrelli. Zoologica, Vol. 36, Pt. 4, pp. 239-242.
- A New Fish of the Genus Gambusia from Southern Veracruz, Mexico, with a Discussion of the Tribe Gam-

busiini Hubbs. With Donn E. Rosen. Zoologica, Vol. 36, Pt. 4, pp. 267-272.

A Second Specific Gene-modifier of Pigment Cell Growth in *Xiphophorus* (*Platypoecilus*) *maculatus*. Anat. Rec., Vol. 111, No. 3, p. 104. Abstract.

Three Phenotypically Similar Pigment-cell Tumors with Three Different Genotypes. With R. F. Nigrelli and Sophie Jakowska. Cancer Res., Vol. 11, No. 4, p. 252. Abstract.

Histochemical Studies on the Blood of Platyfish, Swordtail, and their Hybrids. With Sophie Jakowska and R. F. Nigrelli. Cancer Res., Vol. 11, No. 4, pp. 259-260. Abstract.

PERSONNEL - Mr. Coates continued as Chairman of the Aquarium Committee of the American Association of Zoological Parks and Aquariums, and was reappointed Research Associate of the Jewish Memorial Hospital. Mr. Atz received the degree of Master of Science from New York University in October.

Dr. Nigrelli was reappointed Scientific Consultant to the Bingham Oceanographic Laboratory of Yale University. He served as Deputy Zone Commander in Charge of Organization for the civilian defense plan of the Zoological Park. Dr. Nigrelli also served as Advisor to the Conference Organization Committee of the New York Academy of Sciences. As Secretary of the New York Zoological Park Safety Committee, Mr. Thomas Howley attended the New York City Accident Control Program training course held at the Municipal Building in late November.

Mr. Donn E. Rosen won the Frederick H. Stoye Award for the best paper in ichthyology presented by a student at the meeting of the American Society of Ichthyologists and Herpetologists in Chicago.

Members of the staff gave papers, lectures and demonstrations, and participated in discussions at the following institutions and places:

American Society of Zoologists, Philadelphia meeting.

Society of Protozoologists, Philadelphia meeting.

American Society of Ichthyologists and Herpetologists, Chicago meeting.

American Fisheries Society, Rochester meeting.

American Association of Zoological Parks and Aquariums, Miami meeting.

Tenth Annual Growth Conference, Smith College.

New York Academy of Sciences, symposium on viruses as causative agents in cancer.

New York Zoological Society, conference on normal and atypical pigment cell growth.
Biology Department, Brown University.
Physics Society, College of the City of New York.
College of Mount St. Vincent, New York.
New Jersey Aquarium Society.
Staten Island Aquarium and Terrarium Society.
Staten Island Marine Hospital.
Television Station WCBS-TV.

DEPARTMENT OF TROPICAL RESEARCH

William Beebe, Director
Jocelyn Crane, Research Zoologist
Henry Fleming, Entomologist
John Cody, Artist
Ellen Ordway, Field Assistant

GENERAL ACTIVITIES OF THE YEAR - In the year 1951, the first five and a half months were spent in Trinidad, on the Forty-ninth Expedition of the Department. In August and September Miss Crane attended the International Congress of Entomologists and visited laboratories in various parts of Europe. The remainder of the year we were in the Zoological Park Laboratory, studying the results of our field work and preparing for the succeeding trip.

FORTY-NINTH EXPEDITION - This marked the second year of our occupancy of Simla. We left New York on the Alcoa-Pointer on January 19 and returned by Pan-American plane on June 28. On the way south the following stops were made: Bermuda, St. Thomas, La Guaira, Guanta, Puerto la Cruz, Puerto Sucre, Caripito and Port-of-Spain.

HOUSEHOLD ARRANGEMENTS - We found Simla opened, aired and ready to receive us, servants installed and larder filled. This was due to Mr. Fleming's and Miss Crane's pre-arrangements and foresight and to the ability and loyalty of our servants. Unpacking and distribution of books and instruments were all that was necessary for the Station to be in full swing. The relief of such a home-coming to a furnished tropical laboratory can be fully appreciated only by those of us who, year after year, have had to bring into being a working field station, starting from bare rooms, isolated in far-flung, unfamiliar jungle localities.

GIFTS AND LOANS - Valuable and complex instruments were received on loan from the United States Weather Bureau. Among these was a Sunshine Recorder and a Hygro-thermograph which provided important data for our ecological work. Other instruments were provided

for our use by the Trinidad Meteorological Department, and all their records were placed at our disposal.

To the Alcoa Steamship Company we are indebted for a continuation of generous support in transportation and in the care en route of our delicate instruments. A gift from Mr. Samuel Ordway enabled us to erect a second and much larger Insectary and to initiate other improvements. Mrs. Reed Cary presented a set of interference filters which will be of great value in the analysis of insect colors. Mr. John Phipps sent us a camera fitted with a special seventeen-inch telephoto lens.

ZOOLOGICAL PARK - A living seven-foot Bushmaster was sent to the Zoological Park, and also a Chilean Woolly Monkey. Owl's-head butterflies and several species of mantids were brought up alive, showing the ease with which any Insect House in the Zoo can be supplied from the tropics. The Leaf-cutting queen ant and her colony brought north last year are still thriving in the Reptile House. The Lost in the Jungle Exhibit in the Zoological Park is still popular, although it was inaugurated nine years ago.

EUROPEAN TRIP - As delegate from the Zoological Society, Jocelyn Crane attended the Ninth International Entomological Congress held in Amsterdam between August 17 and 24. She presented a color motion picture film made on recent expeditions of the Department of Tropical Research, before the general assembly of the Congress. Afterwards she visited nineteen research laboratories in the Netherlands, Germany, Austria, France and Spain, returning to New York on September 16.

RELATION WITH INSTITUTIONS - Our relations with the British Colonial Government and its various divisions and with our American Navy Base were as cordial as last year, and we received constant kindnesses from officials and from private individuals. We gave a number of motion picture lectures and exhibitions, and with the Imperial Institute we enjoyed many exchanges of scientific courtesies.

TRIPS - Two expeditions, headed by Henry Fleming, were made to the Aripo Caves, four miles to the east of Simla but to be reached only by many round-about miles of motoring and climbing. On the second occasion a horizontal distance of a mile was trav-

ersed inside the cave. The reconnaissance showed that future, more thorough investigations will yield rich zoological results. Large numbers of oil-birds were located.

A trip to the Oropouche River provided notes on the fish, birds and Manatees.

A notable geographical achievement was the re-cutting and remarking of Simla's boundaries. Owing to the steepness and density of the jungle this proved to be a major feat. Our land is now clearly demarcated, set off by maroon-leaved dracaena plants, better markers than any other kind.

WEATHER - For the second year a dry season was practically non-existent in Trinidad. In February, Simla had twenty-four inches of rain instead of the usual two to seven inches. The worst damage was to the mountain roads, some of which were closed by landslides for several months. Animal life was definitely affected, but our opportunities of studying it were better than usual. The flowering period of certain jungle trees was extended and accentuated.

CONSTRUCTION - Two major additions were built in Simla's compound. The first was a commodious Photographic Laboratory which will furnish all facilities for ordinary and extraordinary photography and for spectroscopic work with ultra-violet and other wave-lengths. A room on the lower floor will serve as dormitory for two visiting scientists. The other building is a second large Insectary for housing and breeding the butterflies and other insects under study. It is a light-framed installation, 24 by 33 feet, by 11 feet high, and covered with fine-meshed copper screening. Within two months it was filled with blossoming plants and was already fulfilling its destiny as a successful house for living insects.

VISITORS AND INVESTIGATORS - The names of our guests filled many pages of the guest book. Among them we especially recall Mr. Curt Reisinger and Miss Earle, Mrs. Mabel Ingalls and daughter Sandra, Mr. and Mrs. Reed Cary, Mr. and Mrs. Wm. Shackelford, the daughter and son-in-law of Mr. Cornelius Agnew. Mr. and Mrs. Samuel Ordway with their son spent several days with us. In late February we welcomed Mr. and Mrs. Fairfield Osborn, whose appreciation and enthusiasm no amount of copious downpours could dampen.

GENERAL ZOOLOGY - Elaborate notes were made on the vertebrate animal life of Simla and the Arima Valley with future monographs in view. A few experimental hauls in the river produced a surprising number of fish, including Armored Catfish. A preliminary census of Arima Valley amphibians, lizards, snakes, birds and mammals revealed from 40 to 80 per cent. of the species of the entire island. The same generous percentages held for the insects which came to our night light, the moths being estimated at about five hundred species.

ACTIVITIES OF STAFF - Ellen Ordway had balanced activities--laboratory work, collecting and preserving insects and taking meteorological data. She made a census of Simla's social wasps and studied their habits. John Cody made numerous excellent sketches and paintings of insect life and did extensive work in the collecting and rearing of larvae, besides sharing many other activities.

Besides his many duties as Entomologist, Henry Fleming took entire charge of construction, the purchase of materials, overseeing the numerous workmen and attending to the actual building of the Insectary and Photographic Laboratory.

Miss Crane and Dr. Beebe continued the general problems of the Department. Considerable data were gathered for phenological studies. The long-range scientific problems all progressed smoothly and steadily. Several parts of the comparative study of mantid behavior are completed, but because of the unexpected occurrence of most interesting evolutionary aspects in the behavior in the young, publication is being postponed until a few more lively broods can be observed during 1952.

Our studies on the function of color in the social lives of insects depend in part on the spectral analyses of their colors, including ultra-violet and infra-red. The patterns of some 25 species of butterflies alone are now completed, and corresponding work is being done with other insects and with insect-visited flowers. Through the cooperation of New York University, results are being analyzed on the densitometer of the Department of Physics.

Correlated with the analyses of the colors themselves are experimental studies on the vision of insects, and of the adaptive value of these color patterns in the lives of their owners.

Thanks to the two insectaries, work on the social behavior of butterflies went forward rapidly,

in spite of the continued rains. Seven species bred in the large house, with no human care except the providing of food-plants. Altogether we have tested the adaptability to cage conditions of more than fifty species. Some individuals live well for several months, others unaccountably die overnight. Little by little we are learning the requirements of each species, and are solving associated problems.

The absorption and fascinated interest on the part of Simla's human visitors of all types, at the sight of flocks of brilliantly colored tropical butterflies flying and feeding in the houses, augur well for the popularity of a similar exhibit in our Zoo.

PUBLICATIONS - Twenty-two contributions from the Department appeared in print during 1951. Ten of these were published in Zoologica and Animal Kingdom. There were four additional translations into foreign languages of "Edge of the Jungle," "High Jungle" and "Book of Bays." A revised edition of "Half Mile Down" was published.

Contributions - 1951

- 890-Annual Report of Department of Tropical Research for 1950, pp. 44-50.
- 891-Migration of Nymphalidae, Brassolidae, Morphidae, Libytheidae, Satyridae, Riodinidae, Lycaenidae and Hesperidae through Portachuelo Pass, Rancho Grande, North-central Venezuela. William Beebe. Zoologica, Vol. 36, No. 1, pp. 1-16.
- 892-Deep-sea Fish of the Bermuda Oceanographic Expeditions. Family Paralepididae. Robert R. Harry. Zoologica, Vol. 36, No. 2, pp. 17-35.
- 893-Department of Tropical Research Begins its Forty-ninth Expedition. Animal Kingdom, Vol. 54, No. 1, p. 31.
- 894-Simla. Fairfield Osborn. Animal Kingdom, Vol. 54, No. 2, p. 33.
- 895-Eastern Pacific Expeditions of the New York Zoological Society. XLIII. Mollusks from the West Coast of Mexico and Central America. Part X. L.S. Hertlein and A.M. Strong. Zoologica, Vol. 36, No. 5, pp. 67-120.
- 896-Edge of the Jungle (Revised Edition). William Beebe. Duell, Sloan and Pierce.
- 897-Half Mile Down (Revised Edition). William Beebe. Duell, Sloan and Pierce.
- 898-Alta Giungla. William Beebe. Milan, Italy.

- 899-Animal Tree-dwellers. William Beebe. Book of Knowledge, pp. 26-29.
- 900-The Case of the Wise and Foolish Mantids. William Beebe and Jocelyn Crane. Animal Kingdom, Vol. 54, No. 4, pp. 98-103.
- 901-I Andernas Djungler. William Beebe. Stockholm, Sweden.
- 902-Wundersame Kustenfahrt. William Beebe. Wiesbaden, Germany.
- 903-The Scientific Work of the Zoological Society from 1946 to 1950. Joint Authorship.
- 904-Jocelyn Crane: Our Own Who's Who. John Tee-Van. Zoolog, Vol. V, No. 19, pp. 1-2.
- 905-A New Genus and Species of Lithosiinae (Moths) from Rancho Grande, North-central Venezuela. Henry Fleming. Zoologica, Vol. 36, No. 13, pp. 183-184.
- 906-Granne med Djungeln. William Beebe. Stockholm, Sweden.
- 907-Jungle Notes from Simla. William Beebe. Animal Kingdom, Vol. 54, No. 5, pp. 137-143.
- 908-Evolution Emerging (Review). William Beebe. Herald-Tribune, September 2.
- 909-Migration of Day-flying Moths Through Portachuelo Pass, Rancho Grande, North-central Venezuela. William Beebe and Henry Fleming. Zoologica, Vol. 36, No. 19, pp. 243-254.
- 910-Migration of Insects (Other Than Lepidoptera) Through Portachuelo Pass, Rancho Grande, North-central Venezuela. William Beebe. Zoologica, Vol. 36, No. 20, pp. 255-266.
- 911-In Trinidad. Bernardine Kielty. Book of the Month Club News, p. 18.

MEMBERSHIP

Donald T. Carlisle, Chairman
Membership Committee

NEW MEMBERS gained during 1951 totaled 237--199 Annual, 29 Contributing and 9 Life. During the year 133 Annual members transferred to Contributing status and 3 Annual members changed to Life membership. The growth in Contributing memberships is an impressive tribute to the loyalty of our friends. Without any wheedling, Contributing memberships have grown to nearly 600 and their help has been a very real one in maintaining membership privileges. Almost a quarter of our membership are now in this class. Dues in 1951 reached the all-time high of \$42,000, and 1952 starts off with an even higher potential, judged by renewals and new memberships during January-February.

It is now evident that during these times it will not be safe to count on a membership gain of less than 400 a year in order to hold the total at its present level. There are many approaches to the problem, and with intensification of effort plus a few innovations in method the desired increase should not be difficult to achieve, judging by the results so far.

In 1945, when membership was almost critically low, it was the activity of loyal friends of former years that started us in the other direction. Members sent in names, wrote letters, made calls, and therefore brought us not only new members but the conviction needed to go ahead with a campaign during which a new membership high was reached and total membership quadrupled over the 1945 figure.

We have gained many new friends since 1945. If these new ones will but follow the example of their predecessors and send us names, there never will be need to worry much over membership.

SUMMARY OF MEMBERSHIP

Benefactors	7
Founders in Perpetuity	12
Founders	14
Associate Founders	7
Patrons	27
Life Members	384
Contributing Members	574
Annual Members	1,927
Honorary Members	2
Fellows	84
Research Associates	2
Corresponding Members	10
	<hr/>
Total	3,050

Corrected to January 1, 1952

THE CONSERVATION FOUNDATION

FOR A FULL STATEMENT of the activities of the Conservation Foundation during the last year, Society members are urged to request a copy of the Annual Report which is now available. The following brief summary attempts merely to highlight the principal events of 1951.

EDUCATION - The conservation course at the Graduate School, Yale University, entered its second year with the opening of the fall term. The seminar on the economics of land use, established in 1950 at the Littauer School of Public Administration, Harvard University, also continues through the college year, 1951-1952, and there is some likelihood that it will be held another year. A research survey of conservation laws and practices in Pennsylvania conducted by the School of Law, University of Pittsburgh, has been completed, and the report of this work will shortly go to the printers for publication.

The Foundation, through a generous gift, was able to sponsor a pilot project in secondary school education, working with the faculty of the District High School of Plymouth, New Hampshire. Teachers College, Columbia University, holds a summer session at the New Hampshire Teachers College at Plymouth and therefore took responsibility for the project and granted Columbia credits to the participating teachers. The project's purpose was to see what is required to integrate conservation teaching in the secondary school curriculum. All the teachers in the high school were held over for a period of three weeks after school closed, during which time they studied the local resources from which the locality derives its livelihood. Other New Hampshire towns followed this course carefully and the two state Teachers Colleges are considering making resource education mandatory for all students.

In the Zoological Society Report for 1950 it was announced that the fourth and last unit of the film series originally planned for Foundation production--the Living Water Series--would be ready

for release in the fall of 1951. There have been various delays, but it will be released in the spring of 1952.

The Spanish and Portuguese versions of the Foundation's films already produced have been made and reviewed by qualified South American experts, and these films will be given a debut at several of the Washington embassies in the spring of 1952.

The so-called "three-minute movies"--short-short films designed for teaching by use of the audience participation principle--have been the subject of considerable work and thought throughout 1951, and we are now hopeful that an important commercial organization will undertake to issue a series of these pictures as the backbone of a promotional campaign.

INVESTIGATIONS AND RESEARCH: ALASKA - A study of Alaska's resources and resource problems was started by Samuel H. Ordway, Jr., early in 1951, and a preliminary critique written by him reached Secretary of the Interior Oscar Chapman during the summer. This circumstance led to the Foundation's being retained as consultant to the Department on the feasibility of its six-year plan for this enormous territory, the last American frontier. A team was set up to analyze the plan and prepare a report to be in the hands of the Department by February 1, 1952. At the year's end it was certain that the deadline would be met.

Whether this report by the Foundation will be available for distribution will depend upon the Department of the Interior for whom it was made. Mr. Ordway's general thoughts on the subject are contained in a signed editorial by him entitled "We Mustn't Let Alaska's Assets Be Lost Through Indifference," which appeared December 12 in the Saturday Evening Post.

POPULATION RESEARCH - In line with the long-held conviction that much more needs to be known about the relationship of world population problems and renewable resources, Foundation staff members have for some time been pursuing the question: what should our position be with respect to this matter now and in the future?

By means of an extremely helpful gift whose source must unfortunately remain anonymous, we are now able to undertake research on this subject. The work will be directed by Dr. Kingsley Davis, Director of Population Research, Columbia University.

Special offices for the project have been set up at 30 East 40th Street, and completion of the study is expected by the summer of 1953.

VEGETATION MANAGEMENT IN AID OF WATER YIELD CONTROL-- "Management" of trees and plants as a means of improving water yield is the basis of the project started August 15, 1951, by Dr. E. A. Colman of the U. S. Forest Service. Dr. Colman has taken a year's leave of absence for this work, which is scheduled for completion in the summer of 1952. It is hoped that the results of this study will appear next year in book form.

CONTINUED WORK WITH THE N. A. M. - Water in Industry, published in 1950 jointly with the National Association of Manufacturers, was a general survey of the subject based on the analysis of questionnaires filled out by the Association's membership. It served to reveal the need for far more detailed information. Therefore the N. A. M. with the Foundation is anticipating a collaboration with the paper and pulp industry, the first in a series of studies of water needs in major industrial groups, with special reference to their quantitative aspects.

STONY BROOK WATERSHED - From a beginning in 1950 the Foundation has served in a consulting capacity to members of a small watershed "community" in the Princeton, New Jersey, area. A survey of land use needs in the area was completed early in 1951. The next step to be taken is the formation of the Stony Brook Watershed Association, to be made up of residents and land-owners of the area, for the purpose of establishing conditions that will lead to a continuing interest in the area's needs. It is hoped, too, that results here may be applicable in other watershed "communities."

MARINE RESOURCES RESEARCH - In view of our vast ignorance with respect to the oceans as resource potentials, the Foundation has long been anxious to undertake a study of just what these potentials are, where they are, and to what extent they are presently available to our economy.

By virtue of a grant of the Rockefeller Foundation, a project in this area was begun in July, 1951, under the direction of Dr. Lionel Walford, Chief of the Fishery Biology Branch, Department of the Interior. This preliminary survey is intended to show

what direction long-range research and development should take. Initial work is expected to be completed by the summer of 1952.

SOIL EROSION SURVEY - This, the first research project of the Conservation Foundation, undertaken in conjunction with the Food and Agriculture Organization of the United Nations, was originally scheduled for 1951 completion so far as the North American continental studies are concerned. The field work is done but publication of the results has been delayed by the FAO's removal to Rome. The South American part of the study is progressing, and only the data from Brazil, Paraguay and Uruguay remain to be collected. It is hoped that a Rockefeller Foundation grant will complete the work in 1952.

ALASKAN ECOLOGY - Since so much of the Territory of Alaska remains untouched, this area offers an almost unique opportunity in today's world for a major contribution to sound wildlife management. The possibilities of this opportunity were reviewed in the autumn of 1951 with Dr. Frank Darling, noted Scottish ecologist, and Dr. Starker Leopold of the University of California. As a result, Dr. Darling will begin field work in Alaska in the spring of 1952 and will be joined there by Dr. Leopold as soon as the latter's teaching duties allow. The range capacity of the tundra, its recovery from overgrazing and the influence of predator control, are among the questions relating to the meat needs of the native population which the survey will attempt to answer. Field work is scheduled to be completed by September and the report should be ready by the end of 1952.

CONVERSION OF SALT TO FRESH WATER - Ability to convert sea water to fresh and deliver it at inland points of use at prices competitive with local sources would have an important bearing on the feasibility of many presently-proposed land reclamation plans involving irrigation.

For more than a year the Foundation has been seeking consultants with the imagination and technical competence to assess the practicability of salt water conversion projects. In December of 1951 an arrangement was entered into with the Nuclear Development Associates, who will begin work in February, 1952, with the expectation of an answer to the conversion question by next fall.

GENERAL ACTIVITIES AND EVENTS - Members of the Foundation staff attended such conferences, meetings and convocations as were appropriate to the pursuit of their work. Books, pamphlets and periodicals in the Foundation library increased by more than 65% during the year and the pressure for more working space required the leasing of some additional 900 square feet of office room on the 9th floor at 30 East 40th Street.

Conservation Foundation Annual Reports may be obtained by Society members without charge by writing to the Conservation Foundation, 30 East 40th Street, New York 16, N. Y.

THE JACKSON HOLE WILDLIFE PARK
and the
JACKSON HOLE RESEARCH STATION
of the
NEW YORK ZOOLOGICAL SOCIETY

James R. Simon, Director

ALL THE STATES, Alaska, Hawaii and eleven foreign countries, were represented in the 1951 Register at the Wildlife Park. The steady increase in total visitors at the Wildlife Park each year, from 74,562 in 1948 to 105,062 in 1951, may be accounted for by several facts: both 1950 and 1951 were outstanding tourist years throughout the country and, of course, the Jackson Hole country received its share. Improved road conditions in this area have been responsible for more tourists venturing into "the Hole." A wider knowledge of the existence of the Wildlife Park has brought many people to the Park as a scheduled part of their itineraries. Extending the season beyond the closing of the Information Center has added to the number of visitors, as the animal display is popular among the many hunters in this country, and riding the hay sled to the winter feed grounds is part of the recommended entertainment of Jackson Hole visitors.

It is very gratifying to realize that there is a wider knowledge of the existence of the Wildlife Park, for considerable time is given to "courtesy information" by correspondence and to publicity through cooperation with magazine and newspaper writers who realize there is usually a story where there are animals. Scenic and animal pictures are always in demand and localizing the subjects to the Wildlife Park has aroused interest. Continued circulation of the Wildlife Park sound film has brought the Park to the attention of many more. Among scientific-minded people, interest has been aroused by various notes, articles and publications in journals as a result of work and studies at the Jackson Hole Research Station.

Despite the fact that Buffalo herds can be seen in other areas, and compared to Elk are relatively

easy to observe during the summer season, these animals continue to be the most important show animals at the Park. More questions are asked about the Buffalo and there seems to be a wider general interest in this creature than in any of the other large North American ruminants.

The Antelope enclosure, although displaying only five animals during the latter part of the season (it was opened August 17), proved to be a great attraction.

Except for Antelope which we hope to increase in number to show in the new enclosure, the Wildlife Park herds are maintaining the desired sizes. Losses last year included one Buffalo and two Elk calves which were killed by Buffalo; one White-tail Deer fawn killed by Coyotes; three animals, one Elk, one Deer, one Antelope, killed by vandals; one obstreperous Buffalo purposely destroyed as a safety measure. From the twenty Buffalo obtained from Yellowstone National Park as original stock for the Wildlife Park, there are now forty-five animals; excess from the Wildlife Park provided the start for the State's two herds at Afton and Pinedale, seventeen and six respectively. At present in the Park's fenced winter pasture are 30 Elk, 22 Buffalo, 9 Mule Deer, 7 White-tail Deer, 4 Antelope--a total of 72 animals being fed. In addition 9 Moose are wintering in the unfenced portion of the Park.

Plans for 1952 call for new efforts aimed at cleanliness of the whole area--particularly the parking areas--as the Park is not immune from the general untidiness of the traveling public. It is hoped that new and more attractive signs will replace the weathered ones now in use.

During the year two illustrated Popular Series booklets were published, one on Elk and one on Moose. These are for general distribution and answer a number of questions brought to the traveler's mind about the Elk herds of this vicinity and about the Shiras Moose of this area.

A Statement of Policy of the Jackson Hole Research Station has been prepared and is being distributed. This includes a cross-index of the workers at the Station to date and the problems on which they have worked, reports presented at various meetings, and the finished publications which have resulted. The 1951 Research program included ten workers representing nine institutions. Research projects of the 1951 summer session were in the fields of animal behavior, life history studies, land man-

agement, browse utilization by big game, microclimate, ecology and parasitology.

Since the Wildlife Park and Research Station are now within the boundaries of the enlarged Grand Teton National Park, it is pleasing to note that the mutual effort in cooperation has been successful. The Park Service people regularly bring caravans to view animals at the Wildlife Park and our personnel send many Information Center visitors to the Park Service Museum at Jenny Lake, and to their scheduled activities--climbs, campfires, movies.

Wildlife film was again prepared for the Annual Meeting of the New York Zoological Society and for the 1951-52 season the Director is currently showing a six-reel silent film based on wildlife throughout the seasons in Jackson Hole.

TREASURER'S REPORTS

For the Year Ended December 31, 1951

Cornelius R. Agnew, Treasurer
30 East 40th Street
New York 16, N. Y.

NEW YORK ZOOLOGICAL SOCIETY

(Except for income from investments which is accounted for in the year received, this balance sheet is prepared on an accrual basis)

ASSETS

Cash in banks and on hand		\$ 103,503.36
Investments (approximate market value \$6,592,497.74)		5,597,719.78
On deposit with the City of New York for new construction		100,000.00
Receivable from the City of New York:		
Appropriations for Zoological Park maintenance - calendar year 1951	\$ 596,692.90	
Less amount received	<u>510,702.53</u>	85,990.37
Other receivables		6,098.03
Inventories		25,470.33
Park facilities assets, less depreciation (note 1):		
Improvements to land and buildings in Zoological Park	127,571.29	
Equipment and miscellaneous items	<u>85,912.55</u>	213,483.84
Prepaid expenses and deferred charges		8,962.44
National collection of heads and horns, art gallery, library and sundry items		1.00
Collection of living animals		<u>1.00</u>
		<u><u>\$6,141,230.15</u></u>

BALANCE SHEET • December 31, 1951

LIABILITIES

Accounts payable and accrued expenses	\$ 34,360.21
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Fund reserves:

General Funds	\$4,339,560.84	
Endowment Funds	1,142,046.57	
Special Purpose Funds	364,931.20	
Reserve for Educational and Other Purposes	42,428.44	
Park Facilities Operating Fund	<u>217,902.89</u>	
		6,106,869.94
		<u>\$6,141,230.15</u>

Notes:

- (1) Park facilities' assets are subject to an agreement with the City of New York, and the net income from park facilities' operations may be used only for the purchase of animals and the improvement of Zoological Park.
- (2) This balance sheet does not include the assets and liabilities of the Pension Fund.

FUND RESERVES

December 31, 1951

General:

General Working Fund	\$	111,899.89	
Anna M. Harkness Fund		1,037,711.74	
Sage Fund		643,594.29	
Mary Clark Thompson Fund		<u>2,546,354.92</u>	
		4,339,560.84	

Endowment:

George F. Baker Fund	\$106,410.80		
Mary Thurston Cockroft Fund	28,483.28		
Robert Jaffray Fund	13,379.66		
William Pyle Philips Fund	10,000.00		
Rockefeller Fund	<u>983,772.83</u>	1,142,046.57	

Special Purpose:

Cadwalader Animal Fund	19,400.69		
Conservation Account	19,107.96		
Damon Fund	15,293.99		
Grant Fund for the Protection of Wildlife	24,056.11		
Laurance S. Rockefeller Fund	134,345.48		
Jacob H. Schiff Fund	103,934.21		
Stokes Bird Fund	4,882.32		
Miscellaneous	<u>43,910.44</u>	364,931.20	

Reserve for Educational and Other Purposes

42,428.44

Park Facilities Operating Fund (see note)

217,902.89
\$6,106,869.94

Note: Park facilities' assets are subject to an agreement with the City of New York, and the net income from park facilities' operations may be used only for the purchase of animals and the improvement of Zoological Park.

SUMMARY OF CHANGES IN FUND RESERVES

During the Year 1951

General Funds

Balance at December 31, 1950	\$4,266,167.67
Receipts and transfers	<u>137,692.25</u>
	4,403,859.92
Expenditures	<u>64,299.08</u>
Balance at December 31, 1951	<u><u>\$4,339,560.84</u></u>

Endowment Funds

Balance at December 31, 1950	1,113,056.27
Receipts	<u>28,990.30</u>
Balance at December 31, 1951	<u><u>\$1,142,046.57</u></u>

Special Purpose Funds

Balance at December 31, 1950	353,669.13
Receipts and appropriations	<u>241,022.71</u>
	594,691.84
Expenditures	<u>229,760.64</u>
Balance at December 31, 1951	<u><u>\$ 364,931.20</u></u>

Reserve for Educational and Other Purposes

Balance at December 31, 1950	47,128.49
Receipts and appropriation	<u>20,016.00</u>
	67,144.49
Expenditures	<u>24,716.05</u>
Balance at December 31, 1951	<u><u>\$ 42,428.44</u></u>

GENERAL WORKING FUND
Year ended December 31, 1951

Balance at December 31, 1950 \$ 59,710.46

Add:

Gifts and legacy	\$37,937.50	
Life memberships	3,900.00	
Conservation film royalties	11,598.74	
Cancellation of grant made in 1950 to Marine Biological Laboratory, Woods Hole	12,000.00	
Refund of unexpended balance of pay- ment to the City of New York in 1949 for Society's share of the con- struction of the Great Apes House and associated contracts	38,417.51	
Transfer of balance from revolving publications account	8,057.28	
Pro-rata share of net profit on sales and redemptions of investments	301.11	
Balance from general income account	<u>4,276.37</u>	<u>116,488.51</u>
		176,198.97

Deduct:

Appropriation for conser- vation film program	20,000.00	
Appropriation for member- ship and general public relations activities for the year 1951:		
Appropriated	\$22,000.00	
Unexpended	<u>1,481.16</u>	20,518.84
Payment to Jackson Hole Wildlife Park, Inc., of Society's share of the operating expenses for the year 1951	10,000.00	
Final payment on account of 1949 appropriation for the production of film-strips on the subject of conservation	4,781.28	
Payment on account of appropriation for grants-in-aid for the research activities of the Jackson Hole Re- search Station	4,600.00	
Final payment on account of appro- priation made in 1949 for operation of the tropical research station at Trinidad, B. W. I.	3,000.00	
Payment to the Pension Fund of Soci- ety's contribution for employees transferred to a permanent basis	898.96	
Donation to the American Society for the Prevention of Cruelty to Animals	<u>500.00</u>	<u>64,299.08</u>
Balance at December 31, 1951		<u>\$111,899.89</u>

GENERAL INCOME ACCOUNT
Year ended December 31, 1951

Income:	
Income from investments	\$274,177.63
Annual dues	42,392.43
Sales of publications	4,167.52
Miscellaneous income	<u>3,877.40</u>
Total income	<u>\$324,614.98</u>
Expenses:	
Actuarial fee	816.00
Annual report	2,559.27
Aquarium research	4,255.07
Art gallery	345.00
Audit fee	2,100.00
Conservation	25,000.00
Custodian fees	3,061.50
Donations	140.00
Educational activities	10,285.46
Employee welfare	2,540.90
Executive office	15,995.89
Insurance	7,218.57
Legal fees	2,623.10
Library	1,020.34
Members - meetings and services	17,587.75
Pensions:	
Fund contribution - 150% of employee contributions, including special items of \$68.42	\$17,037.25
Auxiliary payments	<u>6,472.14</u>
	23,509.39
Photography - salaries and supplies	7,194.19
Publication expenses:	
Salaries and other expense	15,980.85
"Animal Kingdom"	11,905.98
"Zoologica"	<u>8,190.93</u>
	36,077.76
Reception expense	1,771.19
Social security taxes	2,168.14
Traveling expense	7,482.18
Tropical research	18,250.00
Miscellaneous expense	<u>1,306.00</u>
	193,307.70
Appropriation for reserve for educational and other purposes	20,000.00
Park maintenance expenditures for the year 1951	
Less amount provided by New York City	703,723.81
	<u>596,692.90</u>
Amount expended by New York Zoological Society	107,030.91
Balance carried to General Working Fund	<u>4,276.37</u>
	<u>\$324,614.98</u>

GIFTS, GRANTS AND LEGACIES RECEIVED

Year ended December 31, 1951

Cancer Research:		
American Philosophical Society	\$	750.00
Anna Fuller Fund		500.00
National Cancer Institute		<u>23,916.70</u>
		25,166.70

DeForest Grant Scientific Research Fund:		
DeForest Grant		2,000.00

Endowment Funds:		
Estate of Robert Jaffray	\$13,379.66	
Estate of William Pyle Phillips	<u>10,000.00</u>	23,379.66

General Fund:		
Anonymous	1,000.00	
George F. Baker, Jr.	1,000.00	
Mrs. Childs Frick	1,000.00	
Childs Frick	5,000.00	
The Garden Club of America	500.00	
John H. Phipps	2,987.50	
Hubert E. and Anne E. Rogers Foundation, Inc.	100.00	
Estate of Emil Schwartzhaupt	25,000.00	
The Thorne Foundation	1,000.00	
Time, Incorporated	250.00	
Howard A. Van Vleck	<u>100.00</u>	37,937.50

Special Projects:		
The Roger Benjamin Fund, Inc.	50.00	
Miss Emily Buck	50.00	
Percy Chubb II	100.00	
Miss Ella Mabel Clark	100.00	
William O'D. Iselin	25.00	
Fred P. Jaeger	25.00	
Gilbert W. Kahn	200.00	
Miss Winifred Kirkland	200.00	
George Leontios	25.00	
The Sherman Foundation	200.00	
Ogden White	58.75	
Others (25)	<u>201.00</u>	
	1,234.75	

For Department of Tropical Research:		
Anonymous	\$1,885.00	
Mr. & Mrs. C. Reed Cary	<u>100.00</u>	<u>1,985.00</u>

	<u>3,219.75</u>
	<u>\$91,703.61</u>

PARK FACILITIES

Statement of Income and Expense and Operating Fund

Year ended December 31, 1951

Balance of Park Facilities Operating Fund at December 31, 1950		\$186,292.72
Receipts from sales at restaurants, stands, etc. and from services	\$874,382.02	
Less:		
Cost of merchandise sold	\$275,073.45	
Salaries and commissions	322,858.11	
Operating and maintenance supplies	72,573.68	
Depreciation	20,906.87	
Other operating and general expenses	28,578.06	
Write-off of net book value of picnic pavilion replaced by cafeteria in 1951	<u>1,781.68</u>	<u>721,771.85</u>
Net income from sales at restaurants, stands, etc. and from services (see note)		<u>152,610.17</u>
		338,902.89
Deduct:		
Appropriation for park improvements	103,000.00	
Appropriation for the purchase of animals	<u>18,000.00</u>	
		<u>121,000.00</u>
Balance of Park Facilities Operating Fund at December 31, 1951		<u>\$217,902.89</u>

Note: Park facilities' assets are subject to an agreement with the City of New York, and the net income from park facilities' operations may be used only for the purchase of animals and the improvement of Zoological Park.

THE PENSION FUND
(Founded by Andrew Carnegie)

Statement of Operations for the Year ended December 31, 1951

Balance at December 31, 1950:

Investments (approximate market value - \$921,400.00)	\$818,671.86
Uninvested balance of cash	<u>20,435.19</u>
	839,107.05

Receipts:

Income from investments:	
Interest	\$ 13,469.98
Dividends	<u>23,634.45</u>
	37,104.43

Contributions by New York Zoological Society employees	13,681.38
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Contributions by New York Zoological Society (150% of contributions by employees):	
Society	\$ 16,968.83
Facilities	<u>3,553.31</u>
	20,522.14

Special contributions with respect to temporary employees admitted to the fund in accordance with The Pension Fund regulations, Section 8:

Contributions by New York Zoological Society employees	1,010.85
Contributions by New York Zoological Society	<u>1,433.83</u>
	2,444.68

Interest on special contributions to date of admission to the fund

	<u>172.49</u>
	73,925.12
	913,032.17

Expenditures:

Refunds on account of resignations	3,190.57
Pension disbursements	<u>19,335.30</u>
	22,525.87
	890,506.30
	<u>12,201.73</u>

Profit (net) on sale of investments

Balance at December 31, 1951:

Investments (approximate market value - \$966,200.00)	849,098.89
Uninvested balance of cash	<u>53,609.14</u>
	<u>\$902,708.03</u>

PERMANENT WILDLIFE PROTECTION FUND

Cash	\$ 1,010.29
Investments (approximate market value - \$151,717)	<u>125,350.35</u>
	<u>\$126,360.64</u>

SUMMARY OF EXPENDITURES, 1896 to 1951. New York Zoological Society and the City of New York, on Account of the Development and Maintenance of the Zoological Park and the Aquarium, Including the Purchase of Collections and Also for the Scientific and General Purposes of This Society.

Year	EXPENDED BY THE CITY OF NEW YORK				FROM GATE RECEIPTS			EXPENDED BY THE NEW YORK ZOOLOGICAL SOCIETY							
	Zoological Park Maintenance	Aquarium Maintenance	Bond Issues a/c Park & Aquarium	Construction and Repairs	Purchase of Animals	Zoological Park Development	Aquarium Improvements	Zoological Park Maintenance	Aquarium Maintenance	Purchase of Animals	Aquarium Specimens	Heads and Horns Collection	Pension Fund Contribution	Library and Paintings	Scientific and General Purposes
1896	.....	.....	.....	.....	.....	\$ 4,213.63	.....	.....	.....	.....	.....	.....	.....	.....	.....
1897	.....	.....	.....	.....	.....	6,424.61	.....	.....	.....	.....	.....	.....	.....	.....	.....
1898	.....	.....	.....	.....	.....	23,597.80	.....	\$ 1,292.16	.....	.....	.....	.....	.....	.....	\$ 2,903.74
1899	\$ 30,000.00	.....	.....	.....	.....	145,495.80	.....	7,038.61	.....	\$ 8,540.72	.....	.....	.....	\$ 102.76	4,339.20
1900	40,000.00	.....	\$125,000.00	.....	\$ 2,470.88	34,626.24	.....	6,189.33	.....	3,784.32	.....	.....	.....	88.13	3,476.02
1901	65,000.00	.....	300,000.00	.....	2,998.80	18,348.61	.....	3,714.37	.....	11,652.24	.....	.....	.....	462.20	7,597.16
1902	85,000.00	\$ 5,959.97	250,000.00	.....	4,256.50	5,908.69	.....	2,757.57	.....	20,983.07	.....	.....	.....	224.73	11,068.69
1903	104,965.00	46,453.68	280,000.00	.....	5,912.95	1,038.20	.....	.....	.....	20,361.62	.....	.....	.....	456.03	13,608.10
1904	104,965.00	46,439.72	315,000.00	.....	5,421.90	1,013.87	.....	1,894.37	.....	14,299.61	.....	.....	.....	887.16	15,072.84
1905	134,965.00	44,968.50	275,000.00	.....	6,849.00	144.00	.....	.....	.....	20,643.40	.....	.....	.....	418.10	18,773.90
1906	144,965.00	44,987.71	250,000.00	.....	8,132.35	778.48	.....	.....	.....	14,907.36	.....	.....	.....	319.16	17,961.67
1907	141,558.75	44,183.87	100,000.00	.....	8,248.65	370.72	.....	.....	.....	10,606.03	.....	\$ 892.71	.....	644.05	15,999.68
1908	154,627.00	44,157.27	65,000.00	.....	9,446.40	232.27	.....	.....	.....	4,231.61	.....	735.77	.....	1,313.87	14,693.92
1909	162,325.00	45,971.44	10,000.00	.....	9,992.75	2,860.92	.....	.....	.....	9,734.43	.....	7,340.82	.....	609.56	17,168.95
1910	167,632.00	45,974.86	89,500.00	.....	9,909.90	5,918.35	.....	.....	.....	4,339.25	\$ 973.90	2,036.39	.....	1,021.87	20,627.77
1911	174,632.00	47,560.21	155,000.00	.....	11,611.15	1,155.00	.....	.....	.....	6,659.89	1,197.80	1,615.38	.....	1,221.26	23,409.39
1912	182,365.00	46,597.08	.....	.....	11,838.40	40.00	.....	.....	.....	22,750.18	1,350.03	556.94	.....	1,031.55	32,109.01
1913	191,925.00	47,335.62	29,100.00	.....	12,401.25	218.45	.....	.....	.....	10,665.57	1,850.25	486.00	.....	732.97	32,543.88
1914	200,000.00	46,995.53	.....	\$ 9,237.81	3,831.15	2,175.13	.....	.....	.....	22,590.44	1,792.99	338.73	\$3,333.33	3,541.15	28,246.42
1915	200,000.00	46,991.66	21,425.00	9,175.86	.....	887.88	.....	.....	.....	13,629.41	1,466.64	1,024.91	8,000.00	4,181.24	31,398.08
1916	197,074.35	46,996.43	.....	9,599.81	.....	425.30	.....	.....	.....	13,511.12	2,193.57	1,031.47	8,000.00	1,555.12	38,339.99
1917	199,560.00	46,903.61	.....	3,488.31	7,118.90	1,450.05	.....	11,537.79	.....	10,175.70	1,637.15	18.12	8,000.00	2,869.20	44,262.48
1918	207,586.00	48,630.71	.....	2,642.70	.....	48.12	.....	1,580.00	\$ 93.61	8,425.92	960.19	18.61	8,000.00	3,559.85	34,125.49
1919	190,000.00	45,000.00	5,000.00	4,917.84	.....	.....	\$ 3,450.00	19,924.00	407.07	13,345.59	1,028.05	88.27	8,000.00	1,442.07	45,599.71
1920	250,098.27	53,971.48	15,000.00	17,438.28	.....	5,007.00	4,095.03	5,141.92	.....	32,761.08	1,654.02	263.86	8,000.00	2,517.64	51,018.20
1921	276,951.01	65,203.12	86,000.00	25,463.77	.....	88,734.92	53,635.02	6,068.17	976.47	27,442.59	2,165.05	2,661.67	8,000.00	4,698.24	55,684.15
1922	264,618.05	63,341.26	25,000.00	17,060.00	.....	50,888.65	16,153.03	10,074.88	3,326.28	43,047.41	3,057.91	7,191.93	8,000.00	1,765.78	58,797.69
1923	262,724.50	57,166.63	.....	18,388.20	.....	5,000.00	.....	19,019.09	3,319.44	24,456.20	1,432.89	1,550.69	8,000.00	3,391.96	58,404.21
1924	262,471.01	57,319.20	7,970.00	16,806.00	.....	.....	28,233.45	28,956.34	8,097.14	11,560.62	2,013.88	942.34	8,000.00	1,938.77	76,559.41
1925	262,808.69	58,324.89	85,000.00	19,974.05	.....	.....	.....	38,793.01	4,380.45	20,843.01	2,609.55	667.78	8,000.00	1,174.24	242,753.89
1926	273,815.12	62,266.20	1,500.00	20,102.90	.....	.....	.....	45,467.10	7,261.21	23,460.04	2,847.35	306.32	8,000.00	87,915.27	.....
1927	276,855.19	65,216.89	.....	18,960.48	.....	.....	1,395.00	61,968.22	11,656.97	27,545.92	2,861.55	135.00	8,000.00	2,477.37	82,807.54
1928	319,380.50	88,109.12	.....	18,106.25	.....	2,480.06	.....	52,676.35	10,776.84	21,001.88	2,912.97	107.89	8,000.00	1,168.15	88,794.37
1929	338,359.00	71,229.35	100,000.00	21,957.80	.....	13,095.54	984.85	59,673.38	13,670.81	23,783.69	3,572.14	669.48	8,000.00	4,029.63	122,774.78
1930	350,170.92	81,343.46	50,000.00	20,834.91	.....	2,500.89	375.00	65,600.39	16,966.30	17,492.92	1,355.56	639.04	10,000.00	2,726.37	134,278.88
1931	349,344.95	76,408.08	.....	14,890.58	.....	5,131.68	.....	65,601.03	19,541.40	24,439.56	3,650.58	1,707.40	10,000.00	6,713.26	128,871.12
1932	337,490.01	76,071.24	.....	16,710.25	.....	1,852.40	.....	61,127.48	19,155.01	20,039.28	1,934.84	335.00	10,000.00	3,607.97	97,303.32
1933	268,633.38	67,814.24	5,422.63	13,961.02	.....	.....	.....	62,996.66	18,120.73	7,644.14	2,199.91	118.65	10,000.00	3,384.38	86,757.06
1934	257,423.08	65,806.61	.....	11,025.88	.....	1,037.19	.....	66,502.59	18,229.23	9,267.86	1,641.06	162.86	10,000.00	606.53	81,711.26
1935	265,630.94	68,203.46	.....	11,596.51	.....	.....	.....	60,237.94	18,832.57	16,530.28	2,031.56	275.21	10,000.00	383.07	82,929.14
1936	265,057.37	68,760.95	.....	13,496.42	.....	100.00	.....	57,270.94	17,886.45	20,918.46	2,867.50	178.43	10,000.00	470.18	79,835.73
1937	267,192.29	73,807.74	.....	11,527.85	.....	.....	.....	56,262.45	16,408.55	22,417.08	2,799.17	24.79	19,047.09	1,415.39	92,609.40
1938	282,759.71	79,225.20	.....	10,235.70	.....	.....	.....	57,043.10	13,408.11	15,351.51	558.82	.....	20,455.95	431.41	93,543.59
1939	283,280.81	79,164.23	.....	11,019.23	.....	.....	.....	51,050.57	12,941.70	23,012.27	403.75	175.00	20,475.95	345.30	92,576.90
1940	282,761.15	78,905.12	.....	8,392.10	.....	102,343.87	.....	57,513.25	12,022.76	39,627.52	577.10	.....	20,069.17	533.85	98,501.09
1941	286,284.59	62,052.95	.....	15,947.33	.....	187,408.02	.....	84,254.19	9,466.70	57,236.77	574.40	.....	18,206.34	1,316.89	100,846.55
1942	258,656.76	50,931.00	.....	10,169.20	.....	43,088.43	.....	49,226.40	4,807.79	8,369.36	553.52	.....	10,762.57	401.65	144,765.21
1943	305,203.23	33,324.31	.....	11,904.80	.....	38,860.03	3,500.00	51,833.51	5,154.21	2,319.36	336.19	.....	9,832.98	574.01	73,192.91
1944	315,787.82	33,790.82	.....	17,316.09	.....	32,101.60	23,420.00	50,691.82	3,717.28	5,106.59	96.48	.....	10,234.06	405.52	88,594.55
1945	334,288.37	38,158.81	.....	20,745.35	.....	58,943.48	225.52	58,846.39	5,928.38	11,466.19	460.34	.....	12,681.89	1,001.92	112,541.29
1946	366,113.74	42,654.03	.....	24,688.34	.....	122,388.48	*34,997.55	62,439.25	6,742.70	43,037.09	172.30	.....	14,238.14	741.14	168,881.41
1947	440,147.60	40,285.04	.....	22,665.64	.....	101,392.80	*19,669.26	85,294.53	8,715.67	71,342.79	687.91	.....	15,751.26	690.03	348,442.82
1948	469,638.83	38,564.40	.....	30,690.08	.....	93,683.84	116.71	83,652.16	9,419.90	26,461.29	470.63	.....	16,708.48	1,004.40	346,222.76
1949	497,900.12	40,189.02	.....	25,400.02	.....	344,122.56	*4,203.50	82,044.22	11,170.76	50,408.80	1,370.90	.....	31,251.50	1,220.17	333,513.75
1950	506,035.90	40,188.48	.....	23,731.77	.....	62,598.22	.....	85,411.22	11,404.61	22,947.59	767.71	.....	35,049.90	970.52	298,458.78
1951	553,918.55	42,774.35	.....	28,913.22	.....	69,747.69	.....	94,063.94	12,966.97	17,934.34	613.19	.....	17,936.21	1,365.34	271,570.10
Add Premium on Bonds, less			.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Balances Reverting to the City			35,559.89	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Expended in Connection with Preparation and Publication of "A Monograph of the Pheasants" — Gift of Col. Anthony R. Kuser															194,100.00
Expended in Connection with Galapagos Expedition — Gift of Harrison Williams															98,670.00
Transfer by the Society of Endowment for Pension Fund—July 1, 1941															239,523.45
Totals	\$13,410,946.56	\$ 2,712,679.55	\$ 2,681,477.52	\$609,182.35	\$120,443.93	\$1,689,879.47	\$194,453.92	\$1,832,730.69	\$336,974.07	\$1,055,110.97	\$65,695.30	\$34,297.46	\$705,558.27	\$80,715.51	\$5,053,155.00
\$18,805,103.63			\$729,626.28			\$11,048,570.66									

The Society has paid \$40,000.00 to the City, half of which is to be applied to architects' fees for plans for development of the Zoological Park, the other half for architects' fees for plans for the proposed new Aquarium. The City has appropriated an aggregate of \$80,000.00 for these purposes.
* Includes expenditures in respect of proposed new aquarium.

PEAT, MARWICK, MITCHELL & CO.
Certified Public Accountants
Seventy Pine Street
New York 5, N. Y.

ACCOUNTANTS' REPORT

The Board of Trustees
New York Zoological Society
New York, N. Y.

We have examined the balance sheet of the New York Zoological Society as of December 31, 1951 and statements of the transactions of the various funds of the Society and of the Pension Fund for the year then ended. Our examination was made in accordance with generally accepted auditing standards, and accordingly included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

We made a test-check of the subscriptions, donations and dues reported as received and of the income from investments, and found such items to be properly recorded. The securities recorded in the various funds were in agreement with schedules and other supplementary data prepared by the custodians of such securities held for the account of the Society. Bank balances were confirmed directly to us by the depositaries and were reconciled with the respective cash balances recorded in the accounts. We examined approved vouchers and paid checks for a number of representative expenditures.

Park facilities' assets are carried in the accounts at net depreciated book amounts as of December 31, 1940 plus subsequent additions at cost, less retirements. Provision for depreciation from January 1, 1941 to December 31, 1951 has been computed on the resulting book balances.

In our opinion, subject to the comments contained in the previous paragraph, the accompanying balance sheet and statements of transactions of the various funds of the Society present fairly the financial position of the Society at December 31, 1951 on the basis stated therein, and the changes in the funds of the Society for the year then ended, in conformity with generally accepted accounting principles applied on a basis consistent with that of the preceding year.

Peat, Marwick, Mitchell & Co.

New York, N. Y.
February 25, 1952

REPORT OF THE AUDITING COMMITTEE
OF THE
NEW YORK ZOOLOGICAL SOCIETY

To the President and Board of Trustees
of the New York Zoological Society

Dear Sirs:

We have examined the reports of Peat, Marwick, Mitchell & Company on their examination of the accounts of the New York Zoological Society, the Permanent Wild Life Protection Fund, and the Pension Fund of the Society for the year ended December 31, 1951. These reports indicate that the records of the Society have been examined in accordance with generally accepted auditing standards, and certify that the accounts of the Society, as set forth on the balance sheet and statements of various funds, present fairly the financial position of the Society as of December 31, 1951.

These reports also indicate that test checks have been made of the subscriptions, donations, dues and income from investments; that the securities recorded in the various funds were in agreement with the schedules and other supplementary data prepared by the custodian, City Bank Farmers Trust Company; and that bank balances have been confirmed by the depositaries.

We accordingly submit Messrs. Peat, Marwick, Mitchell & Company's reports to you as a satisfactory audit of the accounts of the Society, including the Fund Reserves, General Income Account, Pension Fund Account and the Facilities Account.

Respectfully submitted,

Percy Chubb, 2nd
J. Watson Webb

April 1, 1952

NEW YORK ZOOLOGICAL SOCIETY

INCORPORATION of the New York Zoological Society by the State of New York was accomplished under Chapter 435 of the Laws of 1895 and the basic purposes of the Society were embodied in Section 2:

Said corporation shall have power to establish, maintain and control zoological parks, gardens, or other collections for the promotion of zoology and kindred subjects, and for the instruction and recreation of the people. Said corporation may collect, hold, and expend funds for zoological research and publication, for the protection of wild animal life, and for kindred purposes, and may promote, form, and co-operate with other associations with similar purposes, and may purchase, sell, or exchange animals, plants, and specimens appropriate to the objects for which it was created.

Subsequently, at a special meeting of the Commissioners of the Sinking Fund, City of New York, held on March 24, 1897, a resolution was passed allotting South Bronx Park for the use of the New York Zoological Society and establishing the terms of a management agreement under which the Society has operated since that date, with only minor modifications.

The resolution of March 24, 1897, and the supplemental agreement of January 24, 1942, provided that the Society should furnish the original equipment of buildings and animals, that it should raise \$250,000 by subscription within three years of the date of starting work on the improvement of the grounds, that the Society should have the right to establish an endowment fund to be used solely for the general uses and purposes of the Society unless otherwise specified by the donors, that the City of New York should provide funds for the maintenance and care of the Zoological Park and for the maintenance of the animal collections, that the Zoological Park should be open to the public free at least four days a week, that the Society may expend the net proceeds of facilities only for the purchase of animals and the improvement of the Zoological Park and that the Society should have the right to make and control all appointments of employees and to fix salaries and make promotions.

NEW YORK ZOOLOGICAL SOCIETY

Organized 1895

Presidents

I. Andrew H. Green.....	1895	to 1897
II. Levi P. Morton.....	1897	to 1909
III. Henry Fairfield Osborn.....	1909	to 1925
IV. Madison Grant.....	1925	to 1937
V. W. Redmond Cross.....	1937	to 1940
VI. Fairfield Osborn.....	1940	

First Vice-Presidents

I. J. Hampton Robb.....	1895	to 1897
II. Henry Fairfield Osborn.....	1897	to 1909
III. Samuel Thorne.....	1909	to 1916
IV. Madison Grant.....	1916	to 1925
V. Frank K. Sturgis.....	1925	to 1932
VI. W. Redmond Cross.....	1932	to 1937
VII. Kermit Roosevelt.....	1937	to 1939
VIII. Alfred Ely.....	1939	

Second Vice-Presidents

I. Charles E. Whitehead.....	1895	to 1902
II. John L. Cadwalader.....	1902	to 1915
III. Madison Grant.....	1915	to 1916
IV. Frank K. Sturgis.....	1916	to 1925
V. Henry D. Whiton.....	1925	to 1930
VI. Kermit Roosevelt.....	1930	to 1937
VII. Alfred Ely.....	1937	to 1939
VIII. Laurance S. Rockefeller.....	1939	

Treasurers

I. L. V. F. Randolph.....	1895	to 1901
II. Charles T. Barney.....	1901	to 1903
III. Percy Rivington Pyne.....	1903	to 1922
IV. Cornelius R. Agnew.....	1922	

Secretaries

I. Madison Grant.....	1895	to 1925
II. William White Niles.....	1925	to 1935
III. Fairfield Osborn.....	1935	to 1940
IV. Harold J. O'Connell.....	1941	

Chairmen, Executive Committee

I. Charles E. Whitehead.....	1895	to 1896
II. Henry Fairfield Osborn.....	1896	to 1903
III. Charles T. Barney.....	1903	to 1907
IV. Henry Fairfield Osborn.....	1907	to 1909
V. Madison Grant.....	1909	to 1937
VI. W. Redmond Cross.....	1937	to 1940
VII. Laurance S. Rockefeller.....	1940	to 1943
VIII. Fairfield Osborn.....	1943	to 1945
IX. Laurance S. Rockefeller.....	1945	

Directors

I. William T. Hornaday, Zoological Park.....	1896	to 1926
II. Charles H. Townsend, New York Aquarium.....	1902	to 1937
III. W. Reid Blair, Zoological Park.....	1926	to 1940
IV. Allyn R. Jennings.....	1940	to 1941
V. Charles M. Breder, Jr., New York Aquarium.....	1937	to 1943

BOARD OF TRUSTEES

City of New York
Ex-officio

Hon. Vincent R. Impellitteri, The Mayor
Hon. Robert Moses, Commissioner of Parks

Class of 1952

George F. Baker, Jr.	Fairfield Osborn
George C. Clark	Eben Pyne
F. Trubee Davison	Laurance S. Rockefeller
John Elliott	Archibald B. Roosevelt
Robert I. Gannon, S.J.	John M. Schiff
Peter Grimm	Edwin S. Webster

Class of 1953

Archibald S. Alexander	Warren Kinney
Harry Payne Bingham	William DeForest Manice
A. Raymond Dochez	Harold J. O'Connell
Robert G. Goelet	Landon K. Thorne
DeForest Grant	J. Watson Webb
Eugene Holman	Ogden White

Class of 1954

Cornelius R. Agnew	Childs Frick
Percy Chubb, 2nd	Archer M. Huntington
C. Suydam Cutting	David H. McAlpin
Alfred Ely	John H. Phipps
Marshall Field	Clendenin J. Ryan
	Harrison Williams

OFFICERS OF THE SOCIETY

Fairfield Osborn, President

Alfred Ely, Laurance S. Rockefeller,
Donald T. Carlisle, Vice Presidents

Harold J. O'Connell, Secretary

Cornelius R. Agnew, Treasurer

General Office:
30 East 40th Street
New York 16, N. Y.

EXECUTIVE COMMITTEE

Laurance S. Rockefeller, Chairman	
Cornelius R. Agnew,	David H. McAlpin
ex officio	Robert Moses,
John Elliott	ex officio
Alfred Ely	Harold J. O'Connell,
Robert G. Goelet	ex officio
DeForest Grant	Fairfield Osborn,
Warren Kinney	ex officio

PENSION BOARD

Fairfield Osborn, Chairman	
Cornelius R. Agnew	Alfred Ely
Fred Archer	Warren Kinney
Christopher W. Coates	Eben Pyne
Percy Chubb, 2nd	Herbert F. Schiemann
Lee S. Crandall	John Tee-Van

COMMITTEES OF THE SOCIETY

Nominating Committee for Board of Trustees

E. Roland Harriman, Chairman	
William M. Chadbourne	Samuel Thorne

FINANCE COMMITTEE

David H. McAlpin, Chairman	
Cornelius R. Agnew,	Fairfield Osborn,
ex officio	ex officio
DeForest Grant	John Schiff

AUDITING COMMITTEE

Percy Chubb, 2nd, Chairman	
C. Suydam Cutting	Fairfield Osborn,
William DeForest Manice	ex officio
Harold J. O'Connell	J. Watson Webb
ex officio	

EDITORIAL COMMITTEE

Fairfield Osborn, Chairman	
James W. Atz	Lee S. Crandall
William Beebe	Leonard J. Goss
William Bridges	James A. Oliver
Christopher W. Coates	John Tee-Van

SCIENTIFIC ADVISORY COUNCIL

A. Raymond Dochez	Caryl P. Haskins
Alfred Emerson	K. S. Lashley
W. A. Hagan	John S. Nicholas

HEADS AND HORNS COMMITTEE

Alfred Ely, Chairman	
Laurance S. Rockefeller	F. Carrington Weems
Samuel B. Webb	

GENERAL STAFF

John Tee-Van, Executive Secretary
Herbert F. Schiemann, Comptroller
Gordon Cuyler, Assistant to Executive Secretary
Herbert Knobloch, Associate in Charge, Education
William Bridges, Editor & Curator, Publications
Sam Dunton, Photographer

ZOOLOGICAL PARK

Lee S. Crandall, General Curator
James A. Oliver, Curator of Reptiles & Insects
Leonard J. Goss, Veterinarian
Robert M. McClung, Assistant Curator, Mammals & Birds
Grace Davall, Assistant to General Curator
Quentin Melling Schubert,
Superintendent, Construction & Maintenance
Edward Kearney, Manager, Facilities Department
Charles Paul Gandal, Assistant Veterinarian

William Beebe, Honorary Curator, Birds

AQUARIUM

Christopher W. Coates, Curator and Aquarist
James W. Atz, Assistant Curator
Ross F. Nigrelli, Pathologist
Myron Gordon, Geneticist
Charles M. Breder, Jr.,
Research Associate in Ichthyology
Homer W. Smith, Research Associate in Physiology

DEPARTMENT OF TROPICAL RESEARCH

William Beebe, Director
Jocelyn Crane, Research Zoologist
Henry Fleming, Entomologist

Associates

William K. Gregory

John Tee-Van

CONSERVATION FOUNDATION

Stephen W. Bergen
Kenyon Boocock
George E. Brewer, Jr.
Donald T. Carlisle
John C. Gibbs

Matthew Huxley
Samuel H. Ordway, Jr.
Hugh J. Ross
A. William Smith
Robert Gordon Snider

BY-LAWS OF THE NEW YORK ZOOLOGICAL SOCIETY

ARTICLE I • MEMBERS

SECTION 1. The present members and such others as hereafter shall become members in accordance with these by-laws shall be the members of this Society.

SEC. 2. Annual, contributing and school members shall be elected by the Board or Executive Committee and, upon election, shall qualify for such membership by payment of dues for the first year commencing on the date of their election. No organizations other than schools shall be eligible as such for Society membership.

SEC. 3. Annual dues of annual members shall be \$15, and of contributing and school members \$25. Any person who shall fail to qualify within three months after his election shall be deemed to have declined his election.

SEC. 4. Any member who shall fail to pay his annual dues within three months after notice that they have become due and demand therefor, shall cease to be a member of the Society. He may, however, be reinstated by the Board or Executive Committee for good cause shown.

SEC. 5. Any person who shall have donated to the Society, in the aggregate, cash or the equivalent in value of any of the following amounts shall be eligible for election, by the Board or Executive Committee, to the class of membership appearing opposite such amount:

\$ 300.00	Life Membership	\$ 5,000.00	Founder
\$1,000.00	Patron	\$10,000.00	Founder in Perpetuity
\$2,500.00	Associate Founder	\$25,000.00	Benefactor

An annual member who has paid dues for five consecutive years and a contributing or school member who has paid dues for three consecutive years, may thereafter, at any time, upon payment of the difference between the aggregate dues already paid and \$300, but in no case less than \$100, be elected a Life Member. Upon the death of a trustee, his widow shall be eligible for election, by the Board or Executive Committee, to Life Membership.

SEC. 6. The Board or Executive Committee may elect to membership in the following classes persons who, in their judgment, have achieved the qualifications hereinafter specified:

Fellows:—Persons of marked scientific achievement.

Honorary Members:—Persons who have rendered distinguished services in the science of zoology or natural history.

Corresponding Members:—Persons who have rendered marked services to the Society through correspondence.

SEC. 7. All but annual, contributing and school members shall be exempt from payment of annual dues.

SEC. 8. Benefactors and Founders in Perpetuity shall have the power to designate their respective successors, who shall thereupon be entitled to all the rights and privileges of their predecessors, including the right in turn to desig-

nate their successors. Such designation shall be in writing indorsed or attached to the certificate of membership or by last will and testament.

ARTICLE II • PRIVILEGES OF MEMBERS

SECTION 1. Each annual, contributing and school member shall be entitled to a member's ticket, ten tickets of admission to the Zoological Park and Aquarium on pay days, a copy of the annual report, a copy of the official periodical publication of the Society, and shall be entitled also to the privileges of the Library and Administration Building at the Zoological Park.

SEC. 2. Life Members shall be entitled to all the privileges of annual members and also to ten additional tickets of admission to the Zoological Park and Aquarium on pay days.

SEC. 3. Benefactors, Founders in Perpetuity, Founders, Associate Founders and Patrons shall be entitled to all the privileges of Life Members and also to receive the Society's scientific publication "Zoologica."

SEC. 4. A member's ticket, issued annually, shall admit the member and his immediate family to the Zoological Park and Aquarium on pay days and to lectures and special exhibitions. It may be used by the member's immediate family.

SEC. 5. Each member, other than a member elected pursuant to Article I, Section 6, shall be entitled to one vote at each meeting of the Society.

SEC. 6. Any member who shall fail to comply with the provisions of these by-laws may be suspended from the privileges of membership or dropped from the rolls of the Society, by a majority vote of those present at a duly constituted meeting of the Board or Executive Committee.

ARTICLE III • MEETINGS OF THE SOCIETY

SECTION 1. The Annual Meeting of the Society shall be held on the first Tuesday in March in each year, or on such day thereafter and at such time and place as may be designated by the Board or Executive Committee.

SEC. 2. Special Meetings of the Society may be called upon order of the President or Chairman of the Executive Committee or on the written request of ten Trustees delivered to the Secretary.

SEC. 3. Notice of each annual or special meeting of the Society, stating the time, place and purpose thereof, shall be mailed, at least ten days before an annual and three days before a special meeting, to each member at his address last recorded with the Secretary.

SEC. 4. At all meetings of the Society twenty members shall constitute a quorum.

ARTICLE IV • BOARD OF TRUSTEES

SECTION 1. The property, affairs and business of the Society shall be managed and controlled by a Board of Trustees consisting of thirty-six members

divided into three equal classes, together with the Mayor and the Commissioner of Parks of the City of New York who shall be members *ex officio* of the Board. Each class of elected trustees shall hold office for three years and until its successors are elected. The term of office of one class shall expire each year and its successor shall be elected at the annual meeting of the Society.

SEC. 2. No person shall be eligible for election to the Board unless he shall be either a Benefactor, Founder in Perpetuity, Founder, Associate Founder, Patron or Life Member and, excepting to fill vacancies, unless his name shall have been posted as a candidate by the Nominating Committee or by not less than ten members in writing in a conspicuous place in the office of the Society not less than ten days before the annual meeting.

SEC. 3. Vacancies in the Board may be filled for the unexpired term by the Board or Executive Committee at any regular or special meeting, by ballot, by a majority vote of the members present; but no person shall be eligible for election to fill a vacancy unless he shall have been nominated at a prior or special meeting of the Board or Executive Committee.

SEC. 4. The Board shall hold an annual meeting in December in each year, on a date and at a time and place designated by the Board or Executive Committee. Other meetings of the Board may be called upon order of the President or Chairman of the Executive Committee or at the written request of five Trustees delivered to the Secretary. Twelve Trustees shall constitute a quorum.

SEC. 5. Notice of each meeting of the Board shall be mailed to each Trustee at least seven days before the annual meeting and at least three days before any other meeting.

SEC. 6. A Trustee who shall fail to attend three consecutive meetings of the Board, without being excused by the Board, shall be deemed to have resigned as a Trustee.

SEC. 7. The Board at its annual meeting in each year shall appoint three standing committees — an Executive Committee, a Finance Committee and an Auditing Committee — each of which shall serve for one year, or until its successors are appointed. The Board or Executive Committee may appoint such other Committees and delegate to them such powers as they may deem advisable or necessary. The President shall designate the Chairman of each committee.

ARTICLE V • OFFICERS

SECTION 1. The Board of Trustees at its Annual Meeting in each year shall elect a President, a First Vice President, a Second Vice President, a Treasurer and a Secretary from among the Trustees. The said officers shall hold office respectively for the ensuing year and until their successors are elected. Any vacancy for an unexpired term may be filled by the Board or Executive Committee.

SEC. 2. The President shall preside at all meetings of the Society and of the Board, exercise general supervision of the affairs of the Society, from time to time call attention of the Board to such subjects as in his opinion require consideration and shall exercise the usual functions pertaining to his office. He shall be a member *ex officio* of all standing committees.

SEC. 3. The Vice Presidents, in order of seniority, in case of death, absence, resignation or disability of the President shall perform his duties and exercise his powers.

SEC. 4. The Treasurer shall collect, receive and have custody of the funds and securities of the Society subject to the order of the Board or Executive Committee and shall keep all funds of the Society on deposit with a bank or trust company approved by the Board or Executive Committee. He shall pay all bills and appropriations as ordered by the Board or Executive Committee, shall keep regular and correct accounts and shall submit reports to the Society at its Annual Meeting, to the Board at all Regular Meetings and to the Executive Committee at each meeting. He shall be a member *ex officio* of the Executive Committee. The books of account of the Society shall be open at all times to the inspection of the Trustees and the Executive, Finance and Auditing Committees. The fiscal year of the Society shall be the calendar year.

SEC. 5. The Secretary, unless otherwise ordered by the Board or Executive Committee, shall cause notices to be issued of all meetings of the Society, the Board and the Executive Committee, attend all such meetings and keep the minutes thereof. Together with the President or a Vice President he shall execute all contracts and instruments on behalf of the Society, and shall affix the seal of the Society when authorized to do so by the Board or Executive Committee. He shall conduct the correspondence of the Society, have custody of the seal, archives and books, other than books of account, and perform the usual duties pertaining to his office and such other duties as the Board or Executive Committee may direct. He shall be a member *ex officio* of the Executive Committee.

SEC. 6. The Board or Executive Committee may appoint an Assistant Treasurer or an Assistant Secretary and such other officers or officials as may be deemed necessary to serve at the pleasure of the Board or Executive Committee, and may define their respective duties. A bank or trust company organized under the laws of New York and having its principal place of business in New York City may be appointed Assistant Treasurer and may be made depository of the funds and custodian of the securities and investments of the Society upon such terms and with such powers as may be delegated to it by the Board or Executive Committee.

ARTICLE VI • COMMITTEES

SECTION 1. *Executive Committee* — This Committee shall consist of eight Trustees, together with the President, Treasurer and Secretary as members *ex officio*. Vacancies shall be filled by the Board or by the Committee itself.

In the interim between meetings of the Board, the Executive Committee shall manage and control the property, business and affairs of the Society and exercise all the powers of the Board to the extent not delegated to other Committees or contrary to law. It shall report at each regular meeting of the Board.

Regular meetings of the Executive Committee shall be held on the third Tuesday in each month, unless otherwise ordered by the Chairman, at such time and place as shall be fixed by the Chairman. Special meetings may be called upon order of the Chairman or at the written request of three members of the Committee delivered to the Secretary. Four members including the Chairman shall constitute a quorum.

The Executive Committee shall appoint each year a Nominating Committee

which shall hold office for one year and until its successors are appointed.

The Executive Committee shall have power to fix the salaries of the officers and employees of the Society.

SEC. 2. *Finance Committee* — This Committee shall consist of not less than three Trustees and the Treasurer as members *ex officio*. Vacancies therein shall be filled by the Board or Executive Committee.

The Finance Committee shall have power to sell securities and other investments belonging to the Society and to reinvest proceeds of sale and invest any other funds of the Society available for investment, in such securities or investments as it may deem wise. It shall report quarterly to the Executive Committee all purchases and sales of securities and investments made by it. It may submit to the Board or Executive Committee its recommendations with regard to sales or purchases of securities or other investments.

Notwithstanding the power hereby conferred, the Board or Executive Committee may, at any time, direct the sale of any securities and investments held by the Society, or direct the reinvestment of any proceeds of sale or investment of other funds of the Society available for investment in such securities or investments as it may specify.

All transfers and assignments of the securities registered or standing in the name of the Society shall be executed under the seal of the Society by the President or a Vice President, together with the Secretary or Treasurer.

The report of the Chairman of the Finance Committee shall be sufficient authority to the Chairman of the Executive Committee for approving drafts for purchases of securities or investments.

SEC. 3. *Auditing Committee* — This Committee shall consist of three members, other than members elected pursuant to Article I, Section 6, together with the President and the Secretary as members *ex officio*. Vacancies therein shall be filled by the Board or Executive Committee.

The Auditing Committee shall cause the accounts of the Treasurer and any other accounts of the Society to be audited and certified annually, or as often as it deems advisable, by a certified public accountant of its selection and shall report to the Board at its annual meeting. It shall cause the annual statement of the Treasurer to be audited and certified by such certified public accountant before it is submitted to the Board, and shall annually, or as often as it deems advisable, examine and verify the securities and other investments belonging to the Society.

SEC. 4. *Nominating Committee* — This Committee shall be composed of three members other than Trustees and members elected pursuant to Article I, Section 6. Vacancies therein shall be filled by the Executive Committee. This Committee shall select twelve candidates, to succeed the outgoing class of Trustees, to be voted upon at the ensuing annual meeting. Such candidates shall be selected from among the Benefactors, Founders in Perpetuity, Founders, Associate Founders, Patrons and Life Members of the Society. The names of such candidates shall be posted in a conspicuous place in the office of the Society at least ten days before the annual meeting.

ARTICLE VII. • AMENDMENTS

SECTION 1. These By-Laws may be amended, either by change or repeal of any provision or the adoption of new provisions, at any meeting of the Board by majority vote of the Trustees present, provided such proposed amendment is set forth in full in the notice of such meeting.

